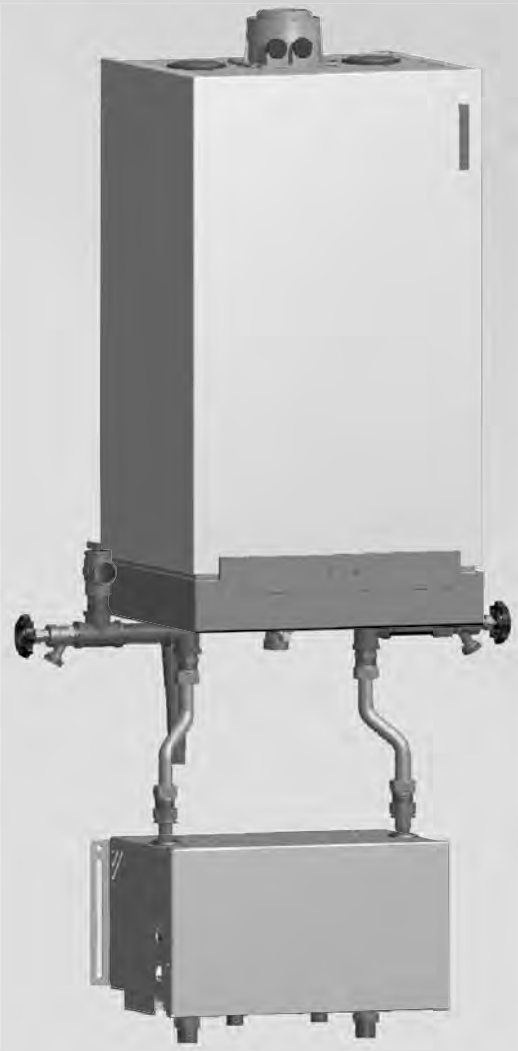
# Installation and Service Instructions

**for use by heating contractor**

**Vitodens 100-W**
**WB1B Series**
Wall-Mounted, gas-fired condensing boiler
with optional on demand hot water Combi***PLUS*** Kit

Heating input 37 to 118 MBH
10.8 to 34.5 kW

# VITODENS® 100-W



**Vitodens 100-W, WB1B (with pre-installed coaxial vent pipe adaptor) and with** Combi***PLUS*** Kit installed.

NSF/ANSI 372

**IMPORTANT**

**Read and save these instructions for future reference.**

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Please file in Service Binder

# Safety, Installation and Warranty Requirements

Please ensure that these instructions are read and understood before commencing installation. Failure to comply with the instructions listed below and details printed in this manual can cause product/property damage, severe personal injury, and/or loss of life. Ensure all requirements below are understood and fulfilled (including detailed information found in manual subsections).

- **Product documentation**
  Read all applicable documentation before commencing installation. Store documentation near boiler in a readily accessible location for reference in the future by service personnel.

  ▶*For a listing of applicable literature, please see section entitled "Important Regulatory and Safety Requirements".*

- **Warranty**
  Information contained in this and related product documentation must be read and followed. Failure to do so renders the warranty null and void.

- **Licensed professional heating contractor**
  The installation, adjustment, service and maintenance of this equipment must be performed by a licensed professional heating contractor.

  ▶*Please see section entitled "Important Regulatory and Installation Requirements".*

- **Contaminated air**
  Air contaminated by chemicals can cause by-products in the combustion process, which are poisonous to inhabitants and destructive to Viessmann equipment.

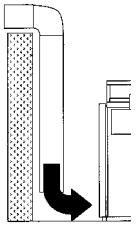
  ▶*For a listing of chemicals which cannot be stored in or near the boiler room, please see subsection entitled "Combustion Air Supply".*

- **Advice to owner**
  Once the installation work is complete, the heating contractor must familiarize the system operator/ ultimate owner with all equipment, as well as safety precautions/requirements, shutdown procedure, and the need for professional service annually before the heating season begins.

- **Carbon monoxide**
  Improper installation, adjustment, service and/or maintenance can cause flue products to flow into living space. Flue products contain poisonous carbon monoxide gas.

  ▶*For information pertaining to the proper installation, adjustment, service and maintenance of this equipment to avoid formation of carbon monoxide, please see instructions supplied with burner.*

- **Fresh air**
  This equipment requires fresh air for safe operation and must be installed ensuring provisions for adequate combustion and ventilation air exist.

  ▶*For information pertaining to the fresh air requirements of this product, please see subsection entitled "Combustion Air Supply".*

- **Equipment venting**
  Never operate boiler without an installed venting system. An improper venting system can cause carbon monoxide poisoning.

  ▶*For information pertaining to venting and chimney requirements, please see section entitled "Venting Connection". All products of combustion must be safely vented to the outdoors.*

**⚠ WARNING**

**Installers must follow local regulations with respect to installation of carbon monoxide detectors. Follow manufacturer's maintenance schedule of the boiler.**

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# Important Regulatory and Installation Requirements

**Codes**
The installation of this unit shall be in accordance with local codes or, in the absence of local codes, use CAN/CSA-B149.1 or .2 Installation Codes for Gas Burning Appliances for Canada. For U.S. installations use the National Fuel Gas Code ANSI Z223.1. Always use latest editions of codes.

In Canada all electrical wiring is to be done in accordance with the latest edition of CSA C22.1 Part 1 and/or local codes. In the U.S. use the National Electrical Code ANSI/NFPA 70. The heating contractor must also comply with both the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1, and the Installation Code for Hydronic Heating Systems, CSA B214-01, where required by the authority having jurisdiction.

▶ *Leave all literature at the installation site and advise the system operator/ultimate owner where the literature can be found. Contact Viessmann for additional copies.*

▶ *This product comes with several safety instruction labels attached. Do not remove!*
*Contact Viessmann immediately if replacement labels are required.*

CSD-1 Field Testing of High Limit Switches for Vitodens boilers – where required by law.

VIESSMANN IS NOT RESPONSIBLE FOR ANY DAMAGES THAT THE FOLLOWING TEST PROCEDURE MAY RESULT IN BY OVERHEATING THE SYSTEM.

The Vitodens 100/200 boilers are equipped with flow switches that when activated disable or enable the burner to operate.

The fixed high limit, when tripped, produces a fault that will require manual reset of the boiler control.

Fixed High Limit fault simulation method #1:
- Close the boiler valve and jump the flow switch.
- Run the boiler at high fire and it will shut down by the coding card (in WB2B models, set coding address 06 to max.) but should continue to stack the boiler temp until the fixed high limit is tripped.
- Once the fixed high limit is tripped, slowly open the boiler valve to safely cool the boiler down.

Fixed High Limit fault simulation method #2:
- Throttle the boiler valve to a point where the burner will run with as little flow as possible.
- Run the boiler to high fire via relays test.
- When the burner shuts down on the electronic limit, close the ball valve to stop the flow.
- The boiler temp should continue to stack to trip the fixed high limit.
- Once the fixed high limit is tripped, slowly open the boiler valve to safely cool the boiler down.

Fixed High Limit fault simulation method #3:
- Remove one of the wires connected to limit switch, this will produce a fault in the boilers control that requires manual reset.

## Important Regulatory and Installation Requirements *(continued)*

For installations on the Commonwealth of Massachusetts, the following modifications to NFPA-54 chapter 10 apply:

Excerpt from 248 CMR 5-08:

2(a) For all side-wall horizontally vented gas fueled equipment installed in every dwelling, building or structure used in whole or in part for residential purposes, including those owned or operated by the Commonwealth and where the side-wall exhaust vent termination is less than (7) feet above finished grade in the area of the venting, including but not limited to decks and porches, the following requirements shall be satisfied:

1. INSTALLATION OF CARBON MONOXIDE DETECTORS. At the time of installation of the side-wall horizontal vented gas fueled equipment, the installing plumber or gas fitter shall observe that a hard wired carbon monoxide detector with an alarm and battery back-up is installed on the floor level where the gas equipment is to be installed. In addition, the installing plumber or gas fitter shall observe that a battery operated or hard wired carbon monoxide detector with an alarm is installed on each additional level of the dwelling, building or structure served by the side-wall horizontal vented gas fueled equipment. It shall be the responsibility of the property owner to secure the services of qualified licensed professional for the installation of hard-wired carbon monoxide detectors.

a. In the event that the side-wall horizontally vented gas fueled equipment is installed in a crawl space or an attic, the hard-wired carbon monoxide detector with alarm and battery back-up may be installed on the next adjacent floor level.

b. In the event that the requirements of this subdivision can not be met at the time of completion of installation, the owner shall have a period of thirty (30) days to comply with the above requirements; provided, however, that during said thirty (30) day period, a battery operated carbon monoxide detector with an alarm shall be installed.

2. APPROVED CARBON MONOXIDE DETECTORS. Each carbon monoxide detector as required in accordance with the above provisions shall comply with NFPA 720 and be ANSI/UL 2034 listed and IAS certified.

3. SIGNAGE. A metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight (8) feet above grade directly in line with the exhaust vent terminal for the horizontally vented gas fueled heating appliance or equipment. The sign shall read, in print size no less than one-half (1/2) inch in size, “GAS VENT DIRECTLY BELOW. KEEP CLEAR OF ALL OBSTRUCTIONS”.

4. INSPECTION. The state or local gas inspector of the side-wall horizontally vented gas fueled equipment shall not approve the installation unless, upon inspection, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CMR 5.08(2)(a) 1 through 4.

(b) EXEMPTIONS: The following equipment is exempt from 248 CMR 5.08(2)(a) 1 through 4:

1. The equipment listed in Chapter 10 entitled “Equipment Not Required To Be Vented” in the most current edition of NFPA 54 as adopted by the Board; and

2. Product Approved side-wall horizontally vented gas fueled equipment installed in a room or structure separate from the dwelling, building or structure used in whole or in part for residential purposes.

## Important Regulatory and Installation Requirements *(continued)*

**Working on the equipment**
The installation, adjustment, service, and maintenance of this boiler must be performed by a licensed professional heating contractor who is qualified and experienced in the installation, service, and maintenance of hot water boilers. There are no user serviceable parts on the boiler, burners, or control.

Ensure main power supply to equipment, the heating system, and all external controls has been deactivated. Close main gas supply valve. Take precautions in all instances to avoid accidental activation of power during service work.

**Technical literature**
Literature for the Vitodens boiler:
- Technical Data Manual
- Installation and Service Instructions
- Operating Instructions and User's Information Manual
- Vitodens Venting System Installation Instructions
- Instructions of other products utilized and installed
- Installation codes mentioned
  in this manual and as locally applicable

▶ *The completeness and functionality of field supplied electrical controls and components must be verified by the heating contractor. This includes low water cutoffs, flow switches (if used), staging controls, pumps, motorized valves, air vents, thermostats, etc.*

▶ *Leave all literature at the installation site and advise the system operator/ultimate owner where the literature can be found. Contact Viessmann for additional copies.*

▶ *This product comes with several safety instruction labels attached. Do not remove!*
*Contact Viessmann immediately if replacement labels are required.*

## About these Installation Instructions

**Take note of all symbols and notations intended to draw attention to potential hazards or important product information. These include "WARNING", "CAUTION", and "IMPORTANT". See below.**

**WARNING**

**Indicates an imminently hazardous situation which, if not avoided, could result in death, serious injury or substantial product/property damage.**

▶ *Warnings draw your attention to the presence of potential hazards or important product information.*

**CAUTION**

**Indicates an imminently hazardous situation which, if not avoided, may result in minor injury or product/ property damage.**

▶ *Cautions draw your attention to the presence of potential hazards or important product information.*

**IMPORTANT**

▶ *Helpful hints for installation, operation or maintenance which pertain to the product.*

▶

▶ *This symbol indicates that additional, pertinent information is to be found.*

▶ *This symbol indicates that other instructions must be referenced.*

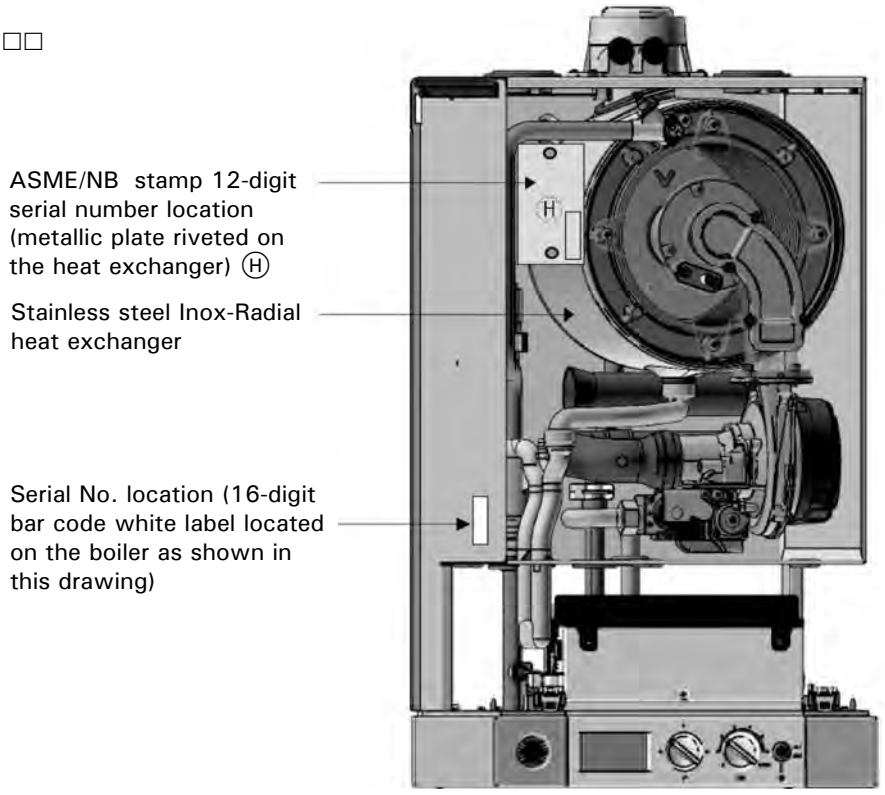
## Applicability

### IMPORTANT

**The boiler serial number must be provided when ordering replacement parts. Both the 16-digit serial number bar code label and the 12-digit ASME/NB serial number correlate to each other. Providing either serial number is sufficient.**

**Note:** Check the boiler rating plate on the Vitodens 100-W, models WB1B-26 or WB1B-35 to ensure it states compatibility with the CombiPLUS kit.

| **Model No.** | Serial No. |
|---|---|
| WB1B 26 | 7457960□□□□□□□□□ |
| and | |
| WB1B 35 | 7457961□□□□□□□□□ |


ASME/NB stamp 12-digit serial number location (metallic plate riveted on the heat exchanger) Ⓗ
Stainless steel Inox-Radial heat exchanger
Serial No. location (16-digit bar code white label located on the boiler as shown in this drawing)
H

## Product Information

Natural / propane gas-fired wall-mounted hot water heating boiler for space heating.

For operation with constant (set-point) and outdoor temperature responsive control in closed loop, forced circulation hot water heating circuits. An external controller is required for indirect storage tank DHW production (an optional CombiPLUS kit providing reliable on demand hot water without a DHW tank is available).

The Vitodens 100-W comes factory set for operation with natural gas. Propane conversion kit is included with each boiler.

Boiler model must be selected based on an accurate heat loss calculation of the building. Ensure boiler model is compatible with connected radiation.

Vitodens 100-W boilers are factory tested and calibrated. Further gas valve adjustments are typically not required during field start-up.

Follow the Vitodens Venting System Installation Instructions to vent this boiler.

# Mechanical Room

During the early stages of new home design, we recommend that proper consideration be given to constructing a separate mechanical room dedicated to gas- or oil-fired equipment including domestic hot water storage tanks.

The boiler must be located in a heated indoor space, near a floor drain, and as close as possible to the wall.

Whenever possible, install boiler near an outside wall so that it is easy to duct the venting system to the boiler.

Locate boiler on walls capable of supporting the weight of the boiler filled with water (see section entitled "Technical Data" on page 86 for information required for total boiler weight calculation). Ensure that boiler location does not interfere with proper circulation of combustion and ventilation air of other fuel burning equipment (if applicable) within the mechanical room.

The maximum room temperature of the mechanical room where the boiler is located must not exceed 104°F (40°C).

## IMPORTANT

**Boiler operation in marine environments (damp, salty coastal areas):**

The service life of the boiler's exposed metallic surfaces, such as the casing and fan housing, is directly influenced by proximity to damp and salty marine environments. In such areas, higher concentration levels of chlorides from sea spray, coupled with relative humidity, can lead to degradation of the exposed metallic surfaces mentioned above. Therefore, it is imperative that boilers installed in such environments not be installed using direct vent systems which draw outdoor air for combustion. Such boilers must be installed using room air dependent vent systems; i.e. using room air for combustion. The indoor air will have a much lower relative humidity and, hence, potential corrosion will be minimized.

## ⚠ WARNING

**If you notice fire coming from the appliance, call the fire department immediately! Do not attempt to extinguish the fire unless qualified to do so.**

## ⚠ WARNING

**Fire causes a risk of burns and explosion!**
- **Shut down the boiler**
- **Close fuel shut-off valves**
- **Use a tested fire extinguisher, class ABC.**

## ⚠ WARNING

**Incorrect ambient conditions can lead to damage to the heating system and put safe operation at risk.**

**Installation area conditions**

- Ensure ambient temperatures are higher than 32°F (0°C) and lower than 104°F (40°C).
- Prevent the air from becoming contaminated by halogenated hydrocarbons (e.g. as contained in paint solvents or cleaning fluids) and excessive dust (e.g. through grinding or polishing work). Combustion air for the heating process, and ventilation of the boiler room must be free of corrosive contaminants. To that end, any boiler must be installed in an area that has no chemical exposure. The list to the right indicates the main, currently known sources.
- Avoid continuously high levels of humidity (e.g. through frequent drying of laundry).
- Never close existing ventilation openings.

**Sources of combustion and ventilation air contaminants. Areas likely to contain contaminants:**

- New building construction
- Swimming pools
- Remodelling areas, hobby rooms
- Garages with workshops
- Furniture refinishing areas
- Dry cleaning/laundry areas and establishments
- Auto body shops
- Refrigeration repair shops
- Metal fabrication plants
- Plastic manufacturing plants
- Photo processing plants
- Beauty salons

**Products containing contaminants:**

- Chlorine-type bleaches, detergents and cleaning solvents found in household laundry rooms
- Paint and varnish removers
- Hydrochloric acid, muriatic acid
- Chlorine-based swimming pool chemicals
- Spray cans containing chlorofluorocarbons
- Chlorinated waxes and cleaners
- Cements and glues
- Refrigerant leaks
- Calcium chloride used for thawing
- Sodium chloride used for water softening salt
- Permanent wave solutions
- Adhesives used to fasten building products and other similar items
- Antistatic fabric softeners used in clothes dryers

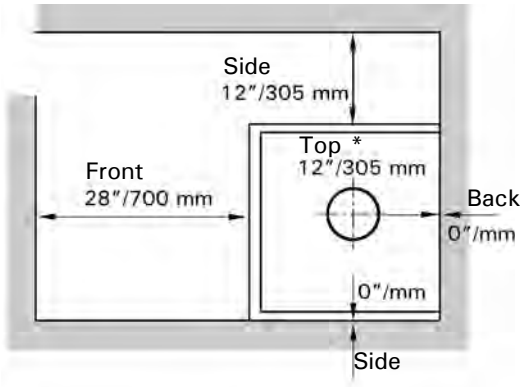
**Before set-up**

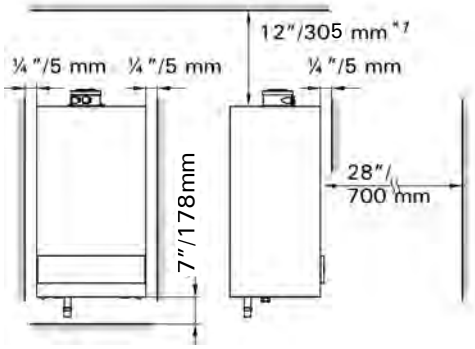
Before placing boiler in its installation location, ensure all necessary accessories are installed.

## ⚠ CAUTION

**The boiler must be installed in such a way that gas ignition system components are protected from water (spraying, splashing, etc.) during boiler operation and service.**

## Minimum Clearances




*1 *Refer to the Installation Instructions of the Vitodens Venting System for details.*

**Recommended minimum service clearances**

**Note:** The Vitodens 100-W boiler has passed the zero inches vent clearance to combustibles testing requirements dictated by the boiler Harmonized Standard ANSI Z21.13. CSA 4.9.2007 and therefore is listed for zero clearance to combustibles when vented with a single-wall special venting system (AL-29-4C material) or UL/ULC-listed CPVC gas vent material. The zero inches vent clearance to combustibles for the Vitodens 100-W boiler supercedes the clearance to combustibles listing that appears on the special venting system label.

Top clearance - 12" (30 cm).

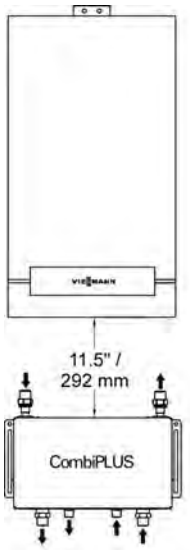
*See the Vitodens Venting System Installation Instructions.*

**Clearance to combustibles**

| Top | Front | Rear | Left | Right | Vent pipe *1 |
|---|---|---|---|---|---|
| 0 | 0 AL, CL | 0 | 0 | 0 | 0 |

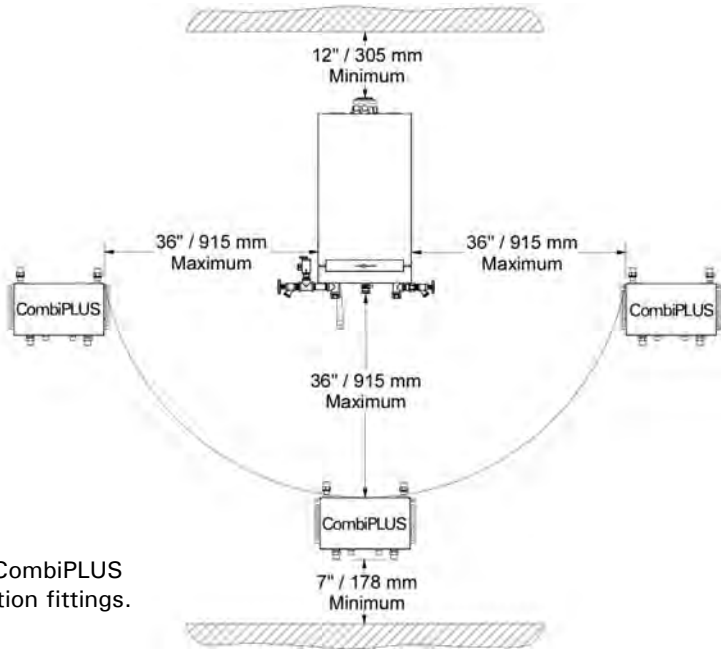
AL = Alcove
CL = Closet

## CombiPLUS Installation Options




Shown is the distance between the boiler and CombiPLUS with Viessmann supplied 7" flex piping connection fittings.

**Note:** The maximum distance between the boiler and the CombiPLUS is restricted by the communication cable to 36" (915 mm).




Shown is the maximum distance between the boiler and CombiPLUS using field supplied fittings and pipes.



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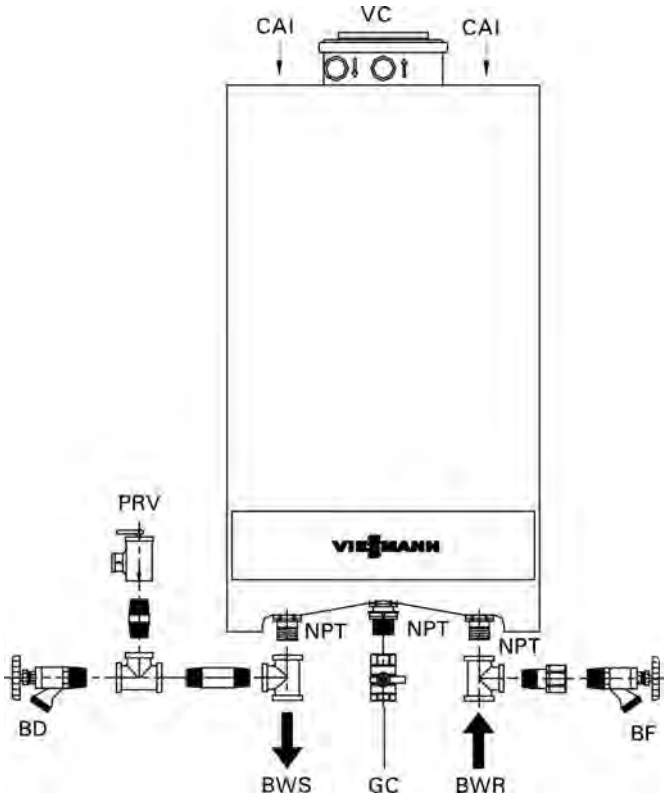
# Preparing the Connections

**Note:** Use an approved pipe sealant or teflon tape when connecting the following installation fittings.

**Connections overview**




This section is an overview only!
Refer to subsequent sections for detailed information on individual piping connections.

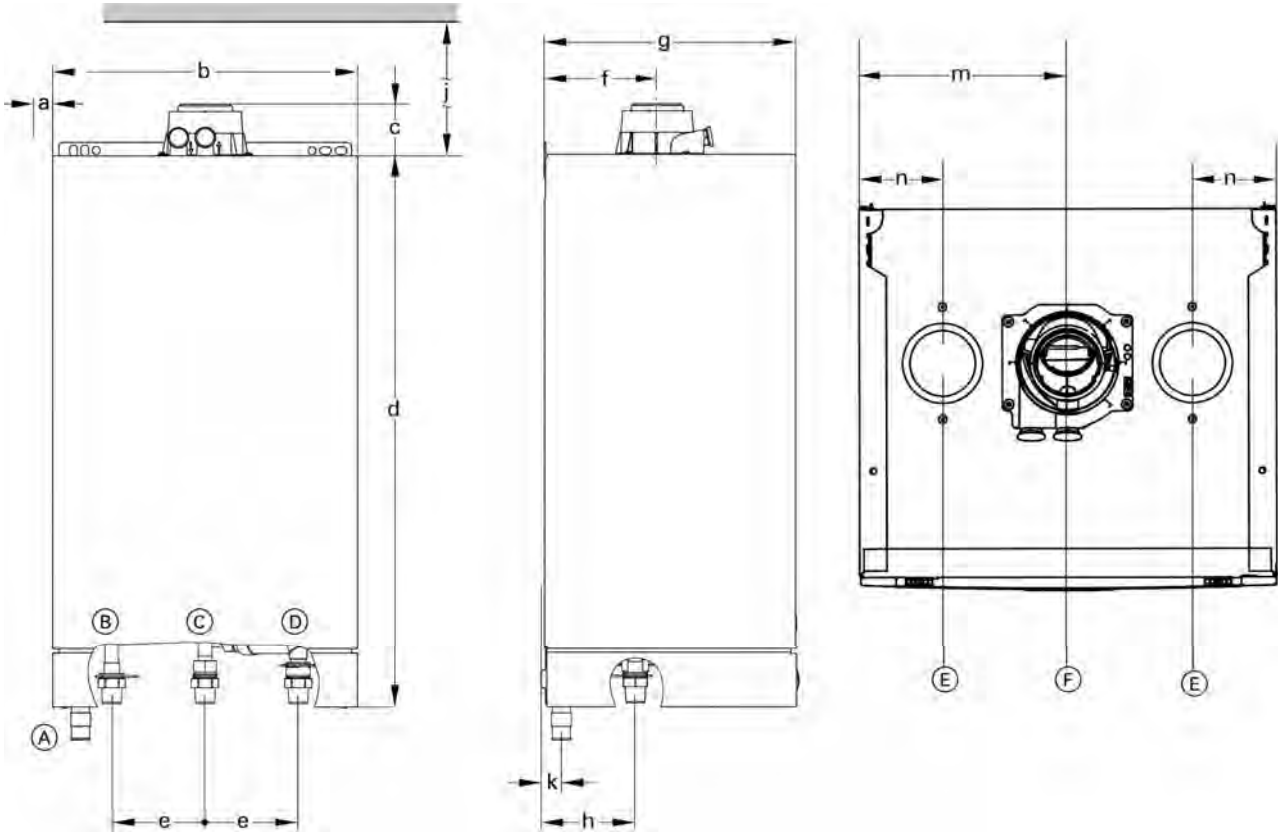
**Piping connections for Vitodens 100-W, WB1B 26 and 35 (factory supplied)**

**Legend**

| | |
|---|---|
| BWR | Boiler water return, ¾" |
| BWS | Boiler water supply, ¾" |
| BD | Boiler drain |
| BF | Boiler fill |
| GC | Gas connection, ¾" NPTM (male thread) |
| PRV | Pressure relief valve |
| NPT | National Pipe Thread |
| VC | Vent connection |
| CAI | Combustion air inlet connection (optional) |

## Preparing the Connections *(continued)*

**Dimensions overview without bottom piping connections**




*Front view* *Side view* *Top view*

**Connections Vitodens 100-W, WB1B 26, 35**

**Legend**
**Connections**
Ⓐ Condensate drain, plastic hose Ø 0.87" (22 mm)
Ⓑ Boiler water supply, NPT ¾" (male thread)
Ⓒ Gas connection, NPT ¾" (male thread)
Ⓓ Boiler water return, NPT ¾" (male thread)
Ⓔ Combustion air opening for double pipe system
Ⓕ Combustion air opening for coaxial system

**Dimensions**
a 14" (355 mm)
b 15¾" (400 mm)
c 2⅝" (68 mm)
d 28½" (725 mm)
e 4 7/8" (123 mm)
f 6⅛" (156 mm)
g 14⅛" (360 mm)
h 5" (125 mm)
j 9 7/8" (250 mm)
k 1¼" (31 mm)
m 7 7/8" (200 mm)
n 3⅛" (80 mm)

*When preparing gas, water and electrical connections in the field, see section entitled "Wall Mounting" on page 15 of this manual for information regarding the installation of the wall mounting bracket.*

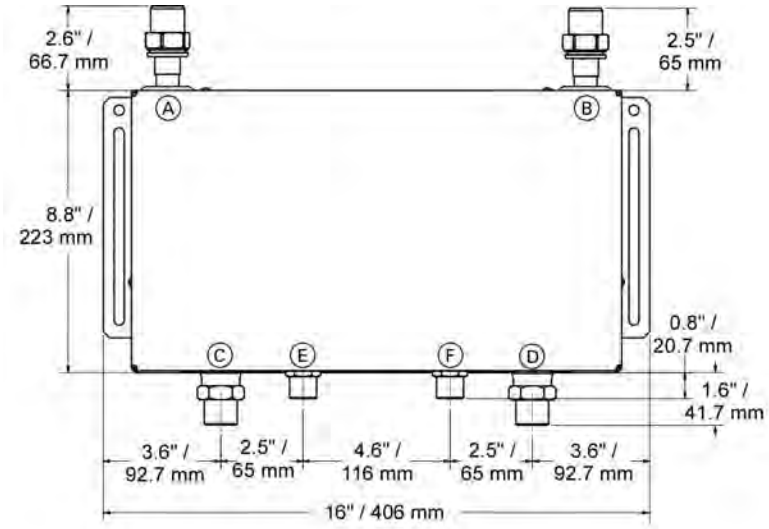
## IMPORTANT

**The maximum ambient temperature must not exceed 104° F (40° C).**

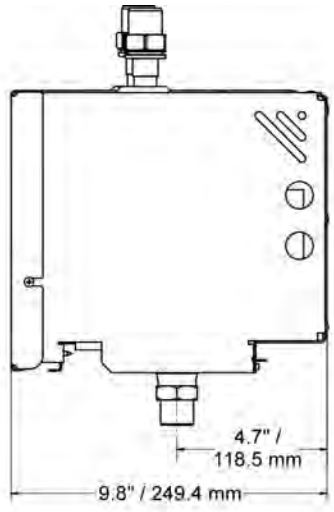
- Heating water connections and gas connection to be made in the field. See connection-specific section for details.
- See subsection entitled "Power supply connection" for details regarding power supply to the Vitodens 100-W boiler.

## Preparing the Connections *(continued)*

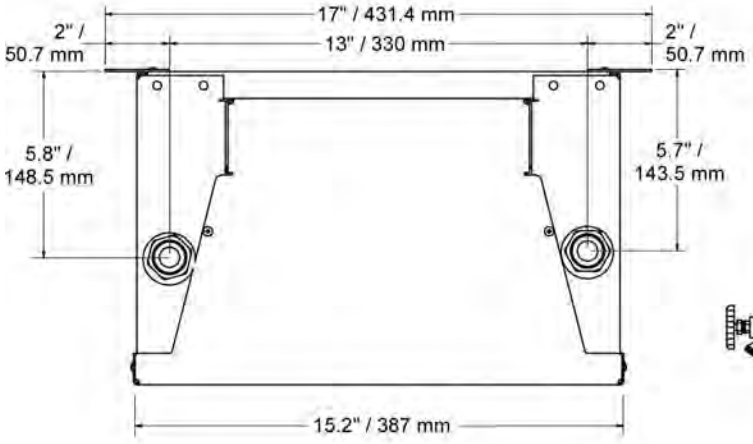
**CombiPLUS connections and piping connections**



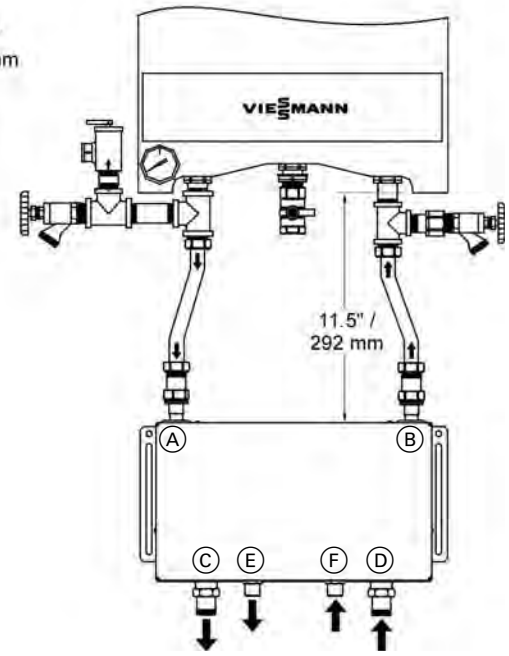

**Front view**




**Side view**




**Top view**




**Front view**

**Legend**

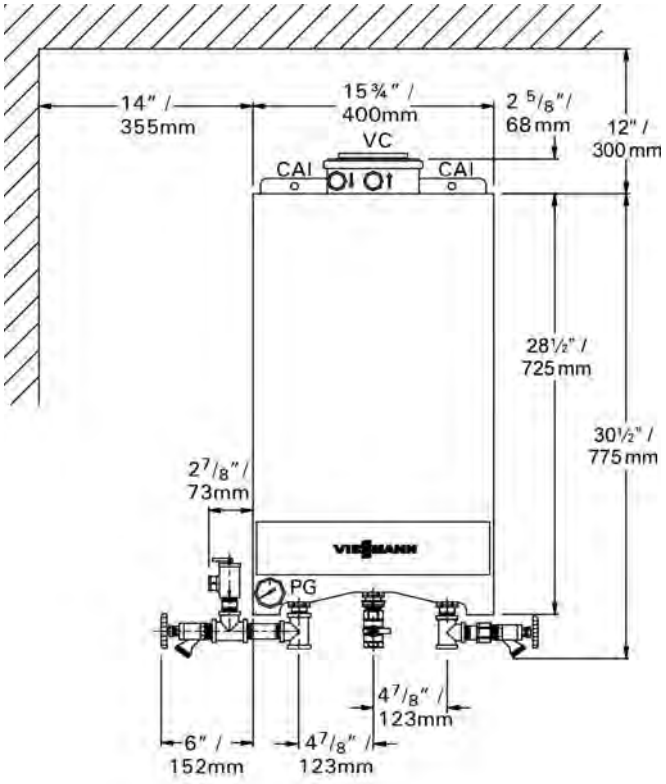
Ⓐ Boiler water supply, NPTM ¾" (male thread)
Ⓑ Boiler water return, NPTM ¾" (male thread)
Ⓒ System water supply, NPTM ¾" (male thread)
Ⓓ System water return, NPTM ¾" (male thread)
Ⓔ DHW, NPTM ½" (male thread)
Ⓕ DCW, NPTM ½" (male thread)

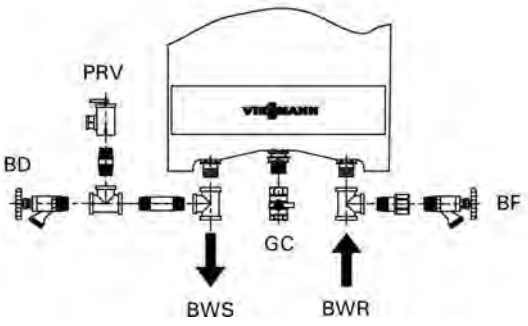
Shown is the distance between the boiler and CombiPLUS with Viessmann supplied 7" flex piping connection fittings.

## Preparing the Connections *(continued)*

This section is an overview only! Refer to subsequent sections for detailed information on individual piping connections.

**Piping connections for Vitodens 100-W, WB1B 26 and 35 (factory supplied)**




**Legend**

| | |
|---|---|
| BWR | Boiler water return, ¾" |
| BWS | Boiler water supply, ¾" |
| BD | Boiler drain |
| BF | Boiler fill |
| GC | Gas connection, ¾" NPTM (male thread) |
| PRV | Pressure relief valve |
| PG | Pressure gage |
| VC | Venting connection |
| CAI | Combustion air inlet connection (optional) |

**Note:** If using the optional CombiPLUS see page 10 and 24.



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# Wall Mounting

**Boiler and CombiPLUS installation**

The Vitodens 100-W boiler and CombiPLUS can be wall-mounted on:

- a brick/concrete wall
- wood studs
- metal studs

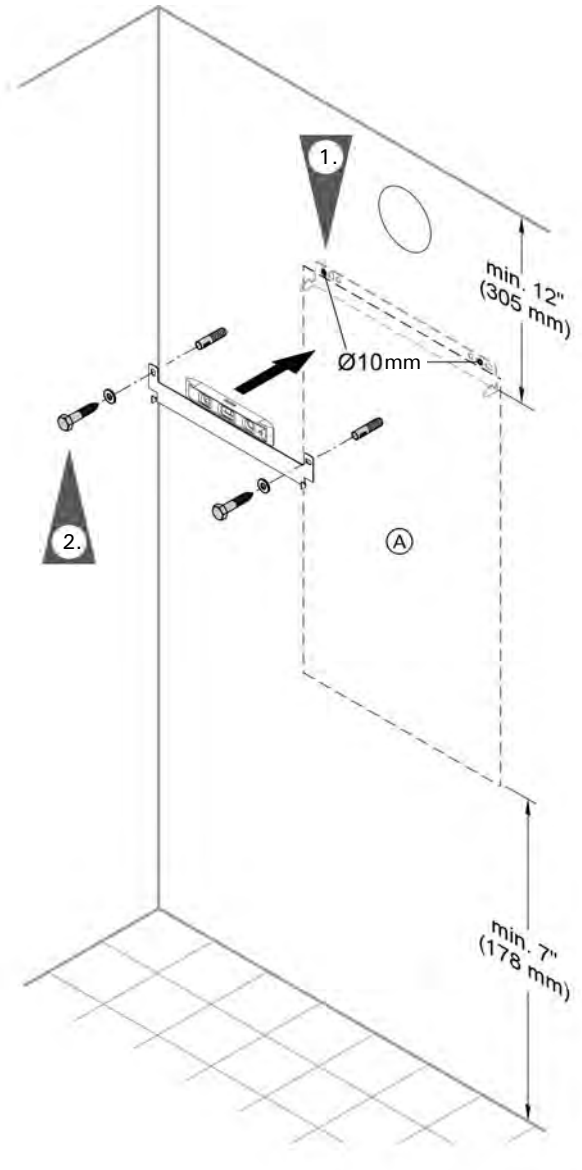
**CAUTION**

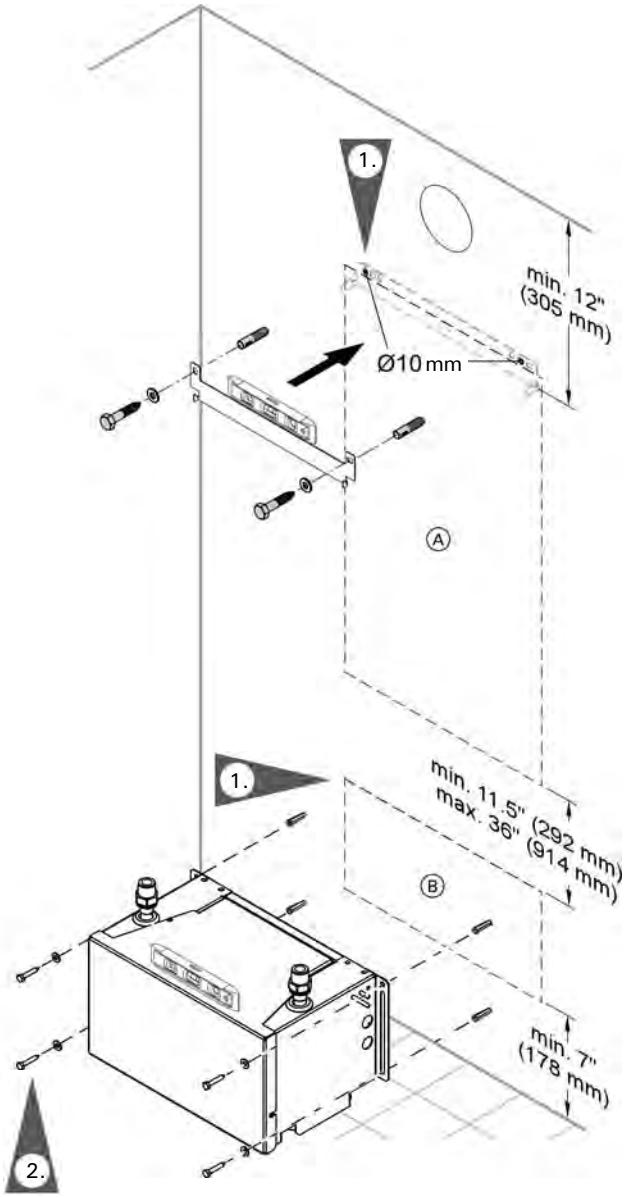
**Whichever mounting method is used, ensure that the boiler bracket and CombiPLUS is tightly and securely fastened to wall. Failure to secure boiler or CombiPLUS properly could cause loosening, posing a severe safety hazard.**

Following are the installation instructions for the mounting bracket on each material. Skip to the installation instructions applicable to your installation requirements.

**Installation of mounting bracket on brick/concrete wall:**

1. Drill holes [Ø ⅜"(10 mm)], using mounting templates supplied with the boiler and the CombiPLUS.
2. Align wall mounting boiler bracket and attach to wall with the screws and plastic anchors supplied. The CombiPLUS is mounted directly to the wall with the screws and plastic anchors supplied.



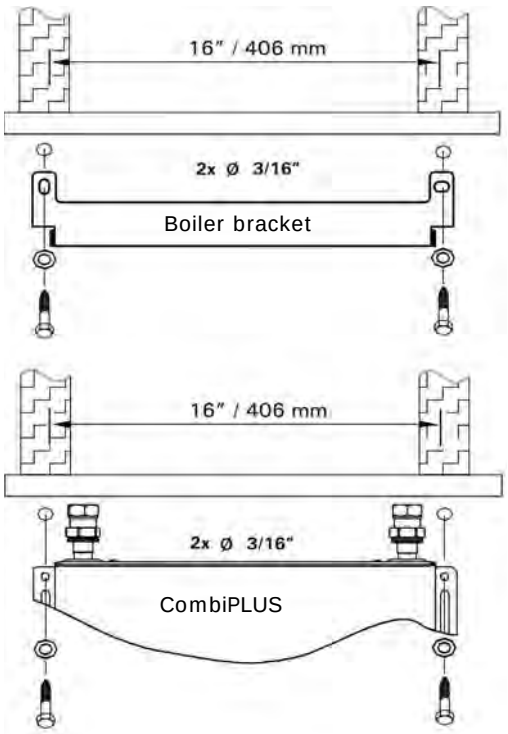

**Legend**

Ⓐ Mounting template

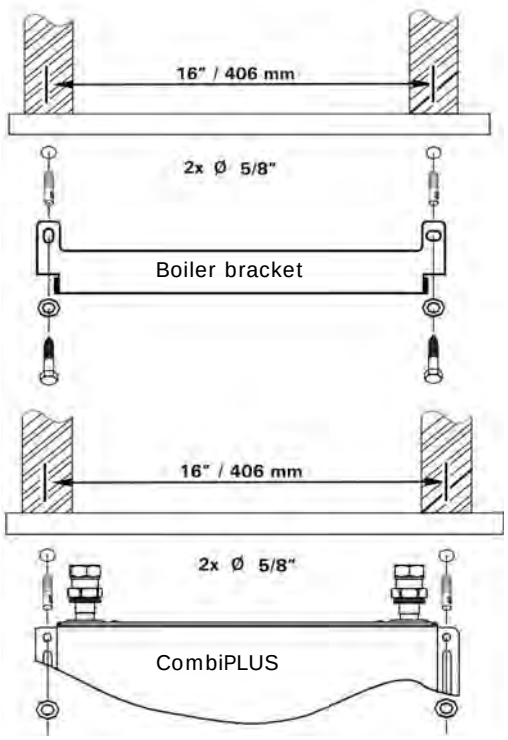
Ⓑ CombiPLUS mounting template

## Wall Mounting *(continued)*

**Installation on wood studs**

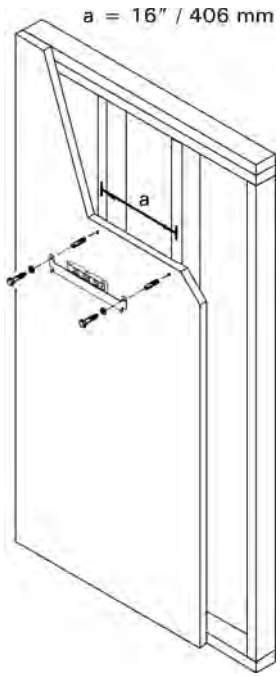



**Installation on metal studs**

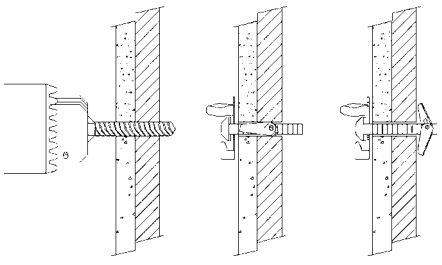



**Boiler mounting bracket and CombiPLUS installation**

Install mounting bracket and CombiPLUS on wood studs as per illustration. Drill $^{3}/_{16}$" pilot holes to insert mounting bolts. Ensure that holes are located in the center of each wood stud. Secure with bolts to wooden studs as shown.




Install mounting bracket and CombiPLUS on metal studs as per illustration. Drill ⅝" pilot holes to insert anchors. Ensure that holes are located in the center of each metal stud. Use appropriate fasteners to mount CombiPLUS to metal studs (not supplied). Secure with bolts to metal studs as shown.





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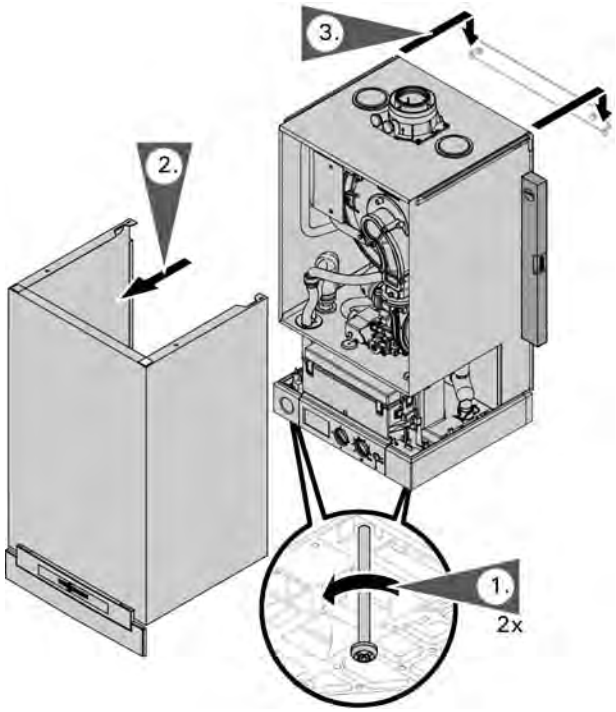
## Wall Mounting *(continued)*



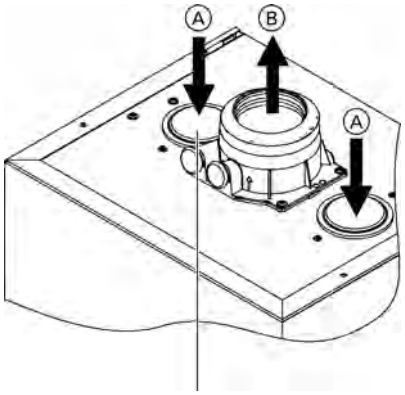

**Mounting Vitodens 100-W boiler**

**Note:** Prior to installing the boiler, if a CombiPLUS kit is also required, verify that the minimum mounting clearances are met.

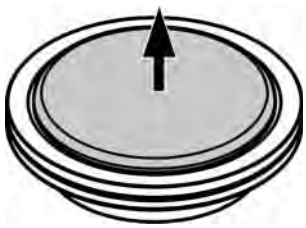
1. Loosen the screws at the bottom of the boiler; do not remove completely.
2. Remove the front panel.
3. Mount boiler onto the mounting bracket.

*For installation of the mounting bracket, see subsection entitled "Wall mounting installation" on page 16 of this manual.*

## Boiler Connections




When utilizing the combustion air inlet seal Ⓐ for Vitodens 100 series boilers, remove the plastic center section and leave the rubber seal in place.



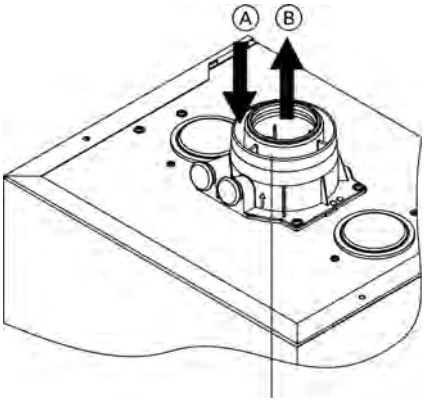
**Legend**

Ⓐ Combustion air intake
Ⓑ Flue vent

**Vent connections**

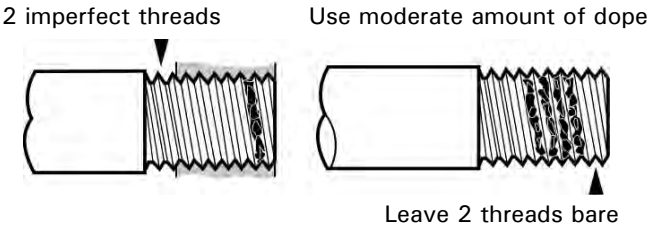
The Vitodens 100-W boiler comes with a preinstalled vent pipe adaptor (as shown).
Run venting system, single-pipe, two-pipe or coaxial, through the side wall, roof or chimney, taking the shortest possible route and at a rising angle (min. 3°).

*Refer to the Vitodens Venting System Installation Instructions.*



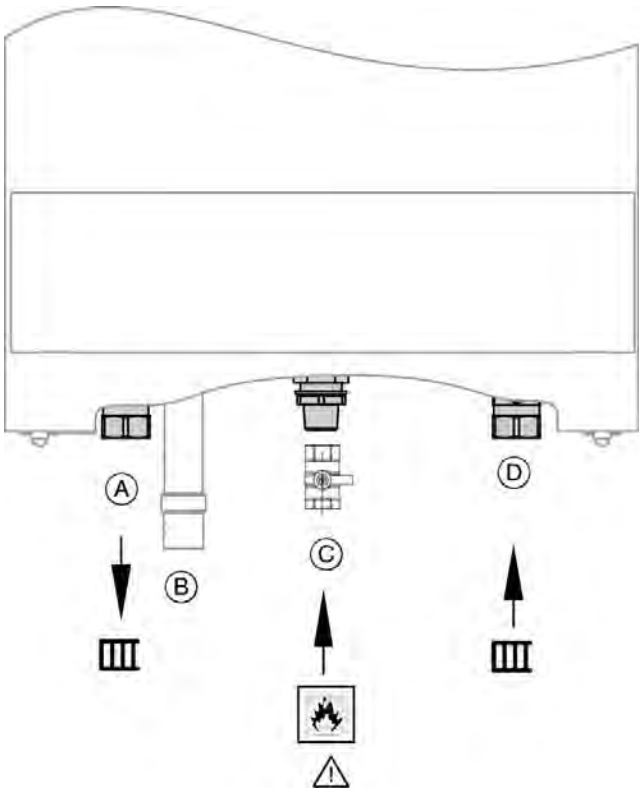

Coaxial combustion air inlet cover shown removed.

## Boiler Connections *(continued)*




**Proper piping practice**

Support piping by proper suspension method.
Piping must not rest on or be supported by boiler.




**Gas connection and piping**

1. Make gas connection in accordance with codes CAN/CSA B149.1 or 2 in Canada. In the United States, use the National Fuel Gas Code ANSI Z223.1/ NFPA 54, as well as local codes where applicable.
2. Close gas shutoff valve on boiler.
3. Perform leak test.
4. Bleed air from gas supply pipe.

See following page for details on gas connection and piping.

**Legend**

Ⓐ Water supply connection
Ⓑ Condensate drain connection
Ⓒ Gas connection
Ⓓ Water return connection



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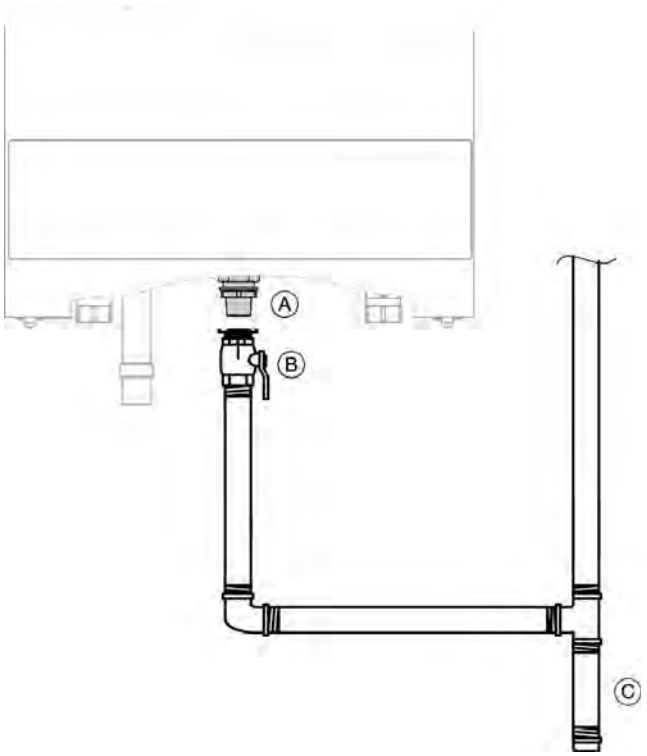
## Boiler Connections *(continued)*




**Legend**

Ⓐ Gas connection
Ⓑ Accessible manual gas shutoff (factory supplied)
Ⓒ Drip leg

**IMPORTANT**

**Max. gas supply pressure: 14 "w.c.**

**Gas connection and piping** *(continued)*

1. Refer to current CAN/CSA B149.1 or 2 in Canada. In the United States, use the National Fuel Gas Code ANSI Z223.1/NFPA 54, as well as local codes for gas piping requirements and sizing. Pipe size to the boiler must be determined based on:
   - pipe length
   - number of fittings
   - maximum input requirements of all gas appliances in the residence.

**IMPORTANT**

**Design piping layout in such a way that piping does not interfere with serviceable components.**

2. Before connecting boiler to gas line, install ground joint union, capped drip leg and a manual equipment shutoff valve. Valves must be listed by a nationally recognized testing agency. Make boiler gas connection as shown on the left.

   Gas connection (NPT).....∅ ¾"
3. Perform gas piping pressure test as described in the following subsection.
4. Identify shutoff valves as such with a tab and familiarize operator / ultimate owner of boiler with these valves.

**WARNING**

**The gas supply piping must be leak tested before placing the boiler in operation.**

**CAUTION**

**Ensure that gas piping is large enough for all appliances in the residence. No noticeable gas pressure drop in the gas line must occur when any unit (or combination of units) lights or runs.**

### Gas piping pressure test

1. Isolate the boiler from the gas supply piping system using the individual manual shutoff valve during pressure tests equal to or less than ½ psig (14 "w.c.)
2. The boiler and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of ½ psig (14 "w.c.)
3. Perform leak test. Use approved liquid spray solution for bubble test. Ensure that no liquid is sprayed on any electrical components, wires or connectors. Do **not** allow leak detection fluid to contact gas valve regulator or regulator vent opening.
4. Correct any and all deficiencies.
5. Remove air from gas line.

When performing the gas piping pressure test, ensure the following requirements are met.

**WARNING**

**Never check for gas leaks with an open flame.**

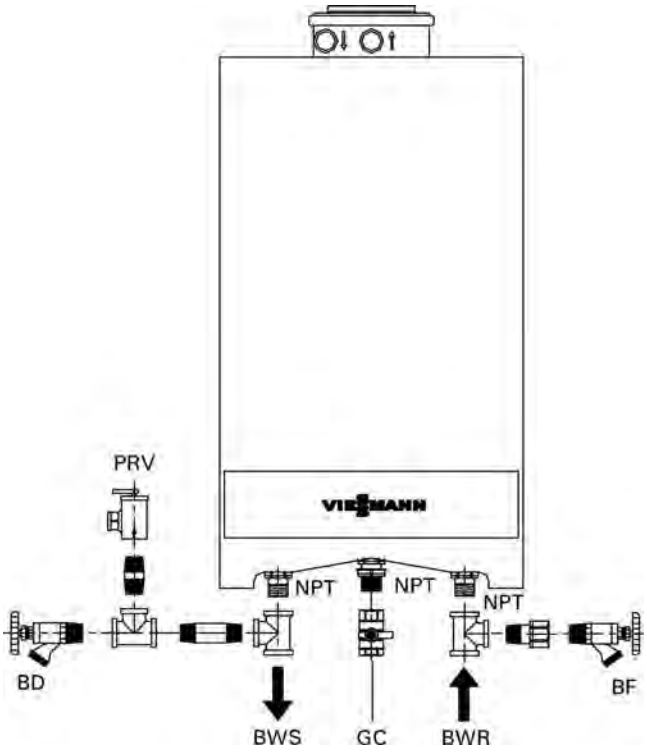
**WARNING**

**Exposing boiler gas pressure regulator and gas valve to extreme pressures renders warranty null and void.**

**IMPORTANT**

**½ psig = 14 "w.c.**

## Boiler Connections *(continued)*




**Legend**

| | |
|---|---|
| BWR | Boiler water return, ¾" |
| BWS | Boiler water supply, ¾" |
| BD | Boiler drain |
| BF | Boiler fill |
| GC | Gas connection, ¾" NPTM |
| PRV | Pressure relief valve |
| NPT | National Pipe Thread |
| PG | Pressure gage |

**Heating water connections**

1. Thoroughly flush heating system (particularly before connecting the boiler to an existing system).

2. Connect boiler to the heating system.

Max. operating pressure.....3 bar (45 psig)
Test pressure.....4 bar (60 psig)

### IMPORTANT

**Damage resulting from pressure exceeding those values stated is not covered by Viessmann warranty.**

- Use a two-hand wrench method when tightening fittings or piping onto the boiler connectors. Use one wrench to prevent the boiler pipes from twisting and the second wrench to tighten the fitting or piping. Failure to support the boiler connection could damage the boiler and its internal piping.

### ⚠ WARNING

**The pressure gage is a sensitive component and may be damaged if the boiler connections are not supported by using a second wrench when tightening fittings and/or piping.**

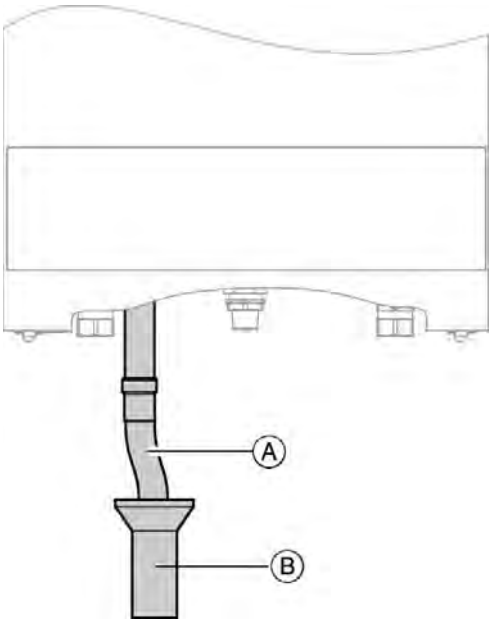
- All plumbing must meet or exceed all local state and national plumbing codes.

### IMPORTANT

**SUPPORT ALL PIPING USING HANGERS. DO NOT support piping by the unit or its components.**

- Use isolation valves to isolate system components.

## Boiler Connections *(continued)*




**Legend**

Ⓐ Flexible discharge tubing

Ⓑ Discharge tubing

**Condensate connection**

The Vitodens 100-W boiler comes with a built-in condensate trap. An external trap is not required when connecting the field drain to flexible discharge tubing. Discharge tubing (field supplied) must be of 1" diameter. Use CPVC, PVC or other material approved by codes listed below.
In the U.S. the drain pipe and fittings must conform to ANSI standards and ASTM D1785 or D2846. CPVC or PVC cement and primer must conform to ASTM D2564 or F493. In Canada use CSA or ULC listed schedule 40 CPVC or PVC drain pipe, fittings and cement.
If the condensate outlet of the Vitodens 100-W boiler is lower than the drain, a condensate pump must be installed. Select a pump which is approved for condensing boiler applications. To avoid condensate spillage, select a pump with an overflow switch. The drain connection must terminate into an open or vented drain as close to the boiler as possible to prevent siphoning of the boiler drain.

1. Install the condensate drain pipe with a suitable gradient.
2. Discharge condensate from the boiler into the drainage system, either directly or (if required) via a neutralization unit (accessory).

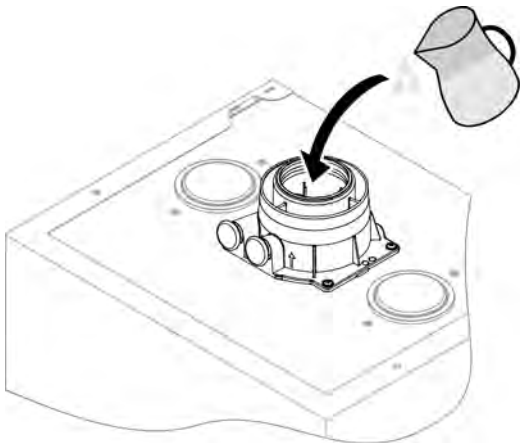
Installation Instructions of Neutralization Unit (if applicable)

**IMPORTANT**

**Pipe ventilation must take place between the siphon trap and the neutralization unit (if applicable).**

**IMPORTANT**

**Do not connect the drain pipe from any other appliance, such as water softener backwash pipe, to Vitodens condensate drain pipe.**



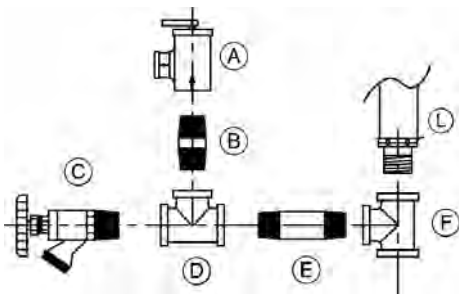
**Fill siphon with water**

Fill a minimum of 10 fl. oz. (0.3 liters) of water into the boiler adaptor.

**WARNING**

**At initial start-up, flue gases may be emitted from the condensate drain. Fill the siphon with water before start-up.**

# Safety Connections and Pressure Testing




**Legend**

Ⓐ Pressure relief valve (30 psig), ¾" NPT
Ⓑ Brass nipple, length 2" x ¾"
Ⓒ Drain valve connection, ¾"
Ⓓ Tee, ¾"x¾"x¾"
Ⓔ Brass nipple, length 3" x ¾"
Ⓕ Tee, ¾"x¾"x¾"
Ⓛ Boiler supply connection

Minimum connection diameters:
Pressure relief valve.....¾"
Discharge pipe .....¾"
Piping to pre-charged expansion tank...¾"

## IMPORTANT

**Install the (approved) factory supplied pressure relief valve.**

**Removal of air from the system must occur via use of air vent(s) in the system supply. To ensure the boiler can be purged of all air, ensure supply/return water lines do not contain restrictive piping where air could be trapped.**

**Installing safety devices on the boiler**

1. Remove loosely pre-assembled combination pressure relief valve and drain valve assembly.
2. Apply sufficient amount of pipe sealant to both ends of all pipe fittings Ⓑ, Ⓒ, and Ⓔ, and install onto tees Ⓓ, Ⓕ.
3. Install pressure relief valve Ⓐ and tighten.
4. Install discharge pipe on pressure relief valve in such a way that...
   - the end of the pipe is not threaded.
   - the pressure relief discharge pipe extends to a floor drain and ends approximately 6" (150 mm) above the drain.

   Ensure that...
   - there is no shutoff valve installed in the discharge pipe.
   - discharge pipe diameter is not reduced.
   - discharge is not piped to outdoors.

## ⚠ WARNING

**Do not install an isolation valve between boiler and pressure relief valve.**
**The discharge pipe for the pressure relief valve must be oriented to prevent scalding of attendants.**
**Pipe pressure relief valve discharge pipe close to floor drain. Never pipe discharge pipe to the outdoors.**

**Low water cut-off**

A low water cut-off may be required by local codes. If boiler is installed above radiation level, a low water cut-off device of approved type (field supplied) must be installed in all instances. Do not install an isolation valve between boiler and low water cutoff (see subsection entitled "Boiler with low water cutoff" on page 48 in these instructions).



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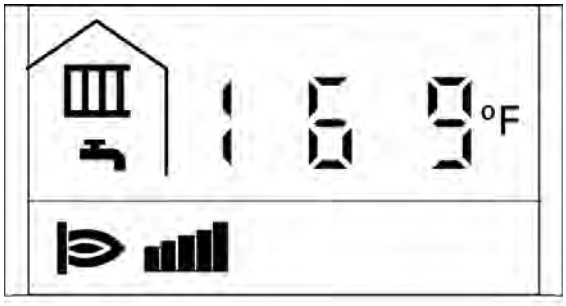
## Safety Connections and Pressure Testing *(continued)*

**Hot water temperature and system pressure**




The hot water reading is constantly displayed during operation.

The boiler water pressure reading is displayed on an analog gauge.

**Performing pressure test on the boiler**

The boiler must be leak tested before being placed in operation. Before boiler is connected to piping or electrical power supply, it must be hydrostatically pressure tested.

1. Cap supply and return connections (¾" NPT Male).
2. Connect a ½" garden hose to boiler drain valve at the bottom of the boiler and fill boiler slowly until pressure gage indicates max. 4 bar (60 psig).
3. Maintain pressure for 15 minutes. During time of pressure testing, do not leave boiler unattended.
4. Inspect all pipe joint connections and safety devices with a flashlight for leaks. A lower manometer reading than 4 bar (60 psig) usually indicates loss of water due to leakage. All leaks must be repaired.
5. After 15 minutes, release water pressure from boiler by opening boiler drain valve slowly, remove caps from supply and return connections as well as ¾" cap from 2" nipple, and install pressure relief valve immediately instead of ¾" cap.

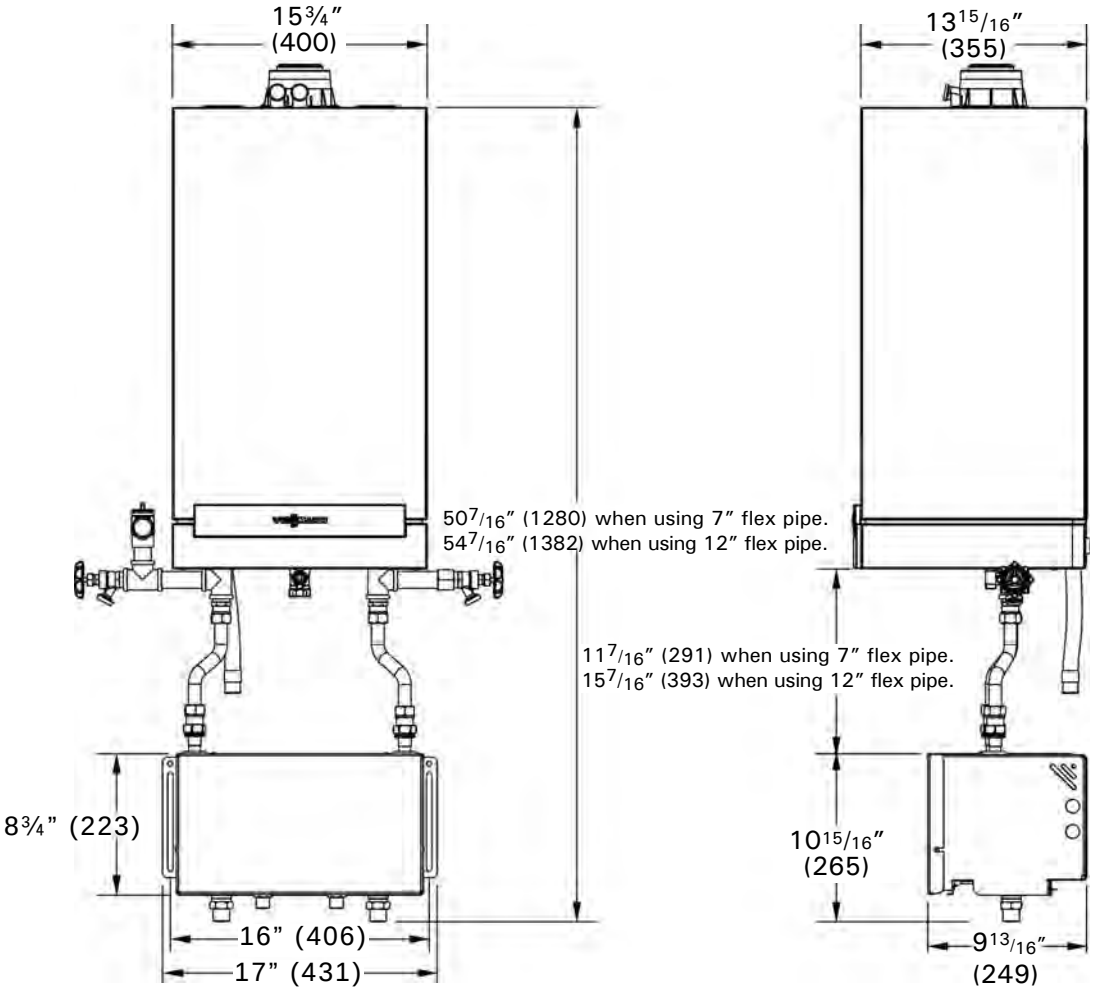
   After boiler has passed the pressure test, proceed with the installation.

**⚠ WARNING**

**Exposing the boiler to pressures and temperatures in excess of those listed will result in damage, and will render warranty null and void.**

See page 57 for fill procedure.

## Preparing the CombiPLUS Connections




**Note:** The flex pipes must be bent due to the offset in the fittings between the boiler and the CombiPLUS.
The nominal length of the 7″ flex pipe after bending is 6½″ ± ¼″.
The nominal length of the optional 12″ flex pipe after bending is 10½″ ± ¼″.



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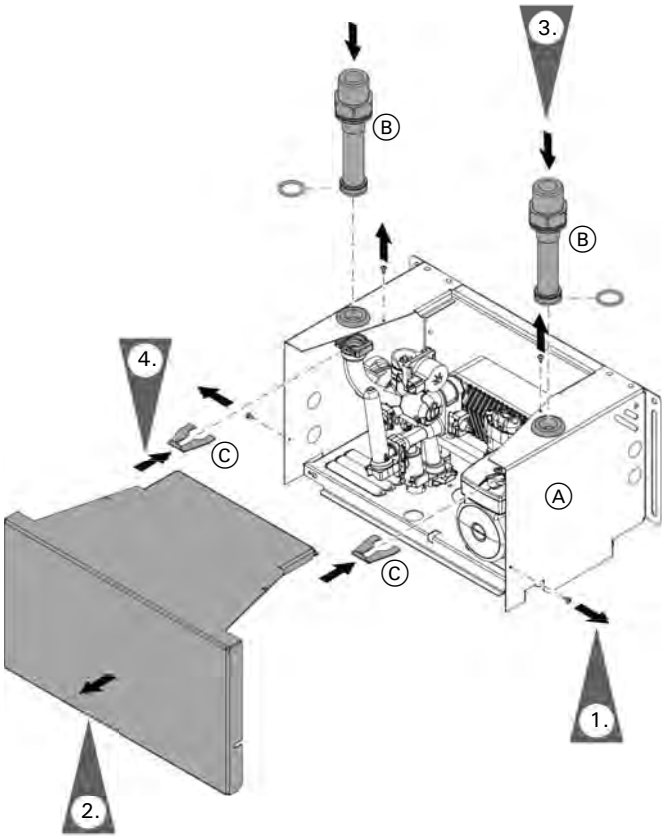
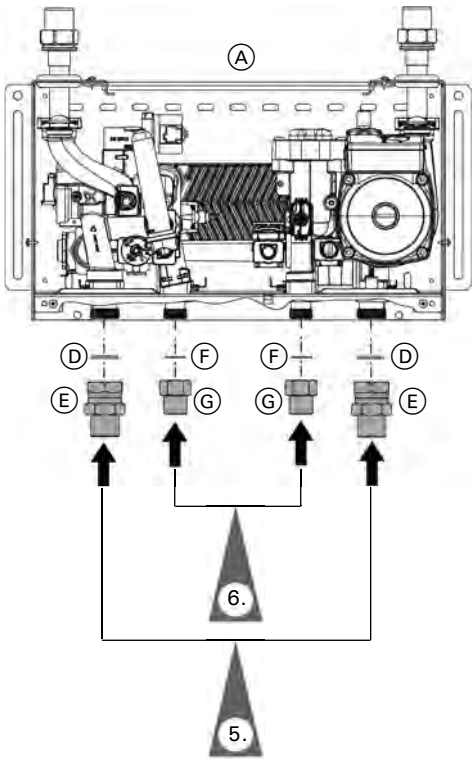
# CombiPLUS Preparations for all Vitodens




Installing the extension fitttings Ⓑ and system connections Ⓓ, Ⓔ, Ⓕ and Ⓖ to the CombiPLUS Ⓐ.

1. Using a Phillips screw driver, remove all four screws holding the CombiPLUS Ⓐ cover and set aside.

2. Remove the cover by pulling straight out from the CombiPLUS Ⓐ and set aside.

3. Lubricate both extension fitting Ⓑ O-rings with supplied lubricant and install each O-ring to the lower portion of the extension fittings Ⓑ. Insert each of the extension fittings Ⓑ on a slight angle through the rubber grommets and into the main supply/return connections of the CombiPLUS Ⓐ. Ensure that the extension fittings Ⓑ are fully seated.

4. Insert a locking clip Ⓒ into the lower portion of each extension fitting Ⓑ.

   **Note:** Pull up on each extension fitting Ⓑ to ensure that they are locked in place.

   See page 34 for water flow directions in piping and fittings.

   **Note:** Use a two-hand wrench method when tightening fittings or piping onto the boiler and CombiPLUS connectors. Use one wrench to prevent the boiler and CombiPLUS pipes from twisting and the second wrench to tighten the fitting or piping. Failure to support the boiler or CombiPLUS connections could damage the boiler and/or the CombiPLUS internal piping.

5. Insert heating circuit gaskets Ⓓ into the female end of each heating circuit adaptor Ⓔ. Install the assembled heating circuit adaptors Ⓔ to the system water supply/return connections on the CombiPLUS Ⓐ.

6. Insert DHW gaskets Ⓕ into the female end of each DHW adaptor Ⓖ.
   Install the assembled DHW adaptors Ⓖ to the DHW/DCW connections on the CombiPLUS Ⓐ.

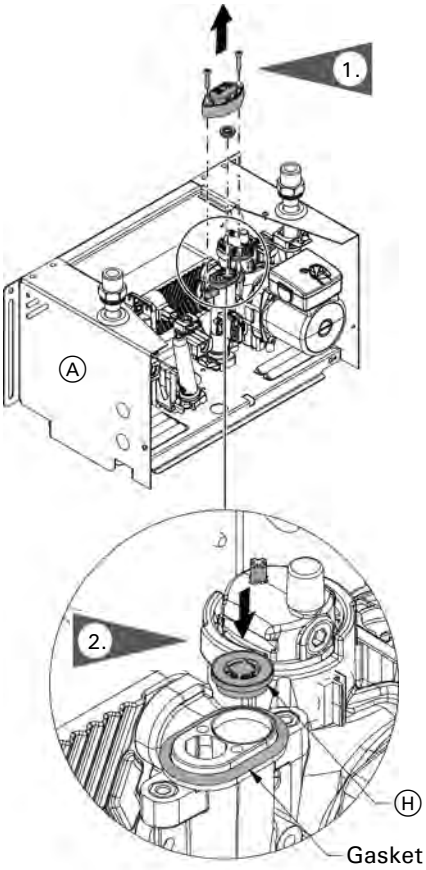
## IMPORTANT

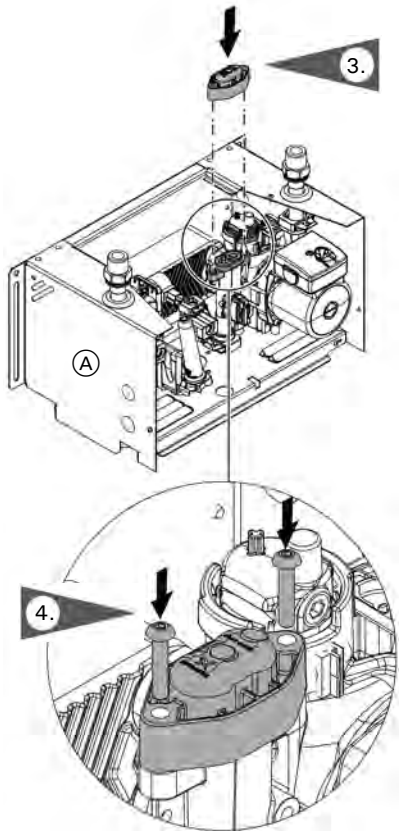
**DO NOT overtighten the adaptor fittings.**

**Legend**

Ⓐ CombiPLUS
Ⓑ Extension fitting (x2)
Ⓒ Locking clip (x2)
Ⓓ Heat circuit gasket ¾" (x2)
Ⓔ DHW gasket ½" (x2)
Ⓕ ¾" Heating circuit adaptor (x2)
Ⓖ ½" DHW adaptor (x2)

# Additional CombiPLUS Preparations for Vitodens 100-W, WB1B-26 only




The CombiPLUS Ⓐ flow restrictor must be exchanged when used with the Vitodens 100-W, WB1B-26.

1. Remove the two 4 mm hex head cap screws from the flow tube cap and set aside.
   Gently remove the flow tube cap by pulling straight up (ensure not to damage the gasket) and set aside.
   Remove the factory installed (14L/min) flow restrictor (a small flat screw driver maybe required to unseat the restrictor) and discard.

2. Install the new flow restrictor Ⓗ (for the WB1B-26 model only) supplied with the installation fittings.

   Color Specification:
   WB1B-26, black on white, 10L/min.
   WB1B-35, brown on white, 14L/min.

3. Reinstall the flow tube cap (ensure not to pinch or damage the gasket).

4. Reinstall the two 4 mm hex head cap screws securing the flow tube cap. Torque screws to 4.5 Nm (40 lb/in)

**Legend**

Ⓐ CombiPLUS
Ⓗ 26kW flow restrictor



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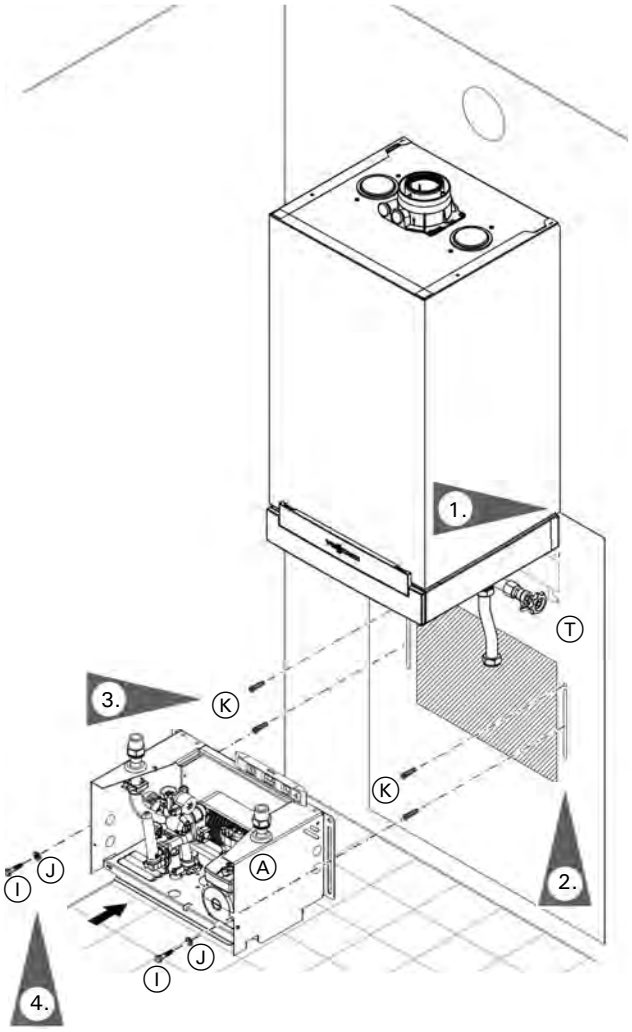
## Mounting the CombiPLUS




Prepare the wall and mount the CombiPLUS Ⓐ using the supplied template and mounting hardware.

1. Pull the bottom of the boiler away from the wall approximately 1/2″ (12 mm) and slide the top of the CombiPLUS mounting template Ⓣ between the wall and the boiler. Release the boiler and allow the weight of the boiler to hold the template in place.

   The top outline on the template shows the lower imprint of the boiler (shown in dotted lines). Adjust the template to the boiler in this position when connecting the 12″ flex piping.

   The second outline on the template shows the lower imprint of the boiler (shown in solid lines). Adjust the template to the boiler in this position when connecting the 7″ flex piping.

2. Drill a hole through the top mounting hole as shown on the template (x2). Drill a hole in the centre of the slot as shown on the template (x2).
   Remove the template.

3. Install the supplied anchors Ⓚ into the wall (if required).

4. Install the supplied washers Ⓙ on to the lag bolts Ⓘ.

   Install the lag bolts/washers into the wall anchors (if used) and through the slots of the CombiPLUS Ⓐ.

   **Note:** Leave the lag bolts loose enough to allow up and down adjustments in the slot.

   **Note:** Refer to the installation Instructions for additional mounting options.

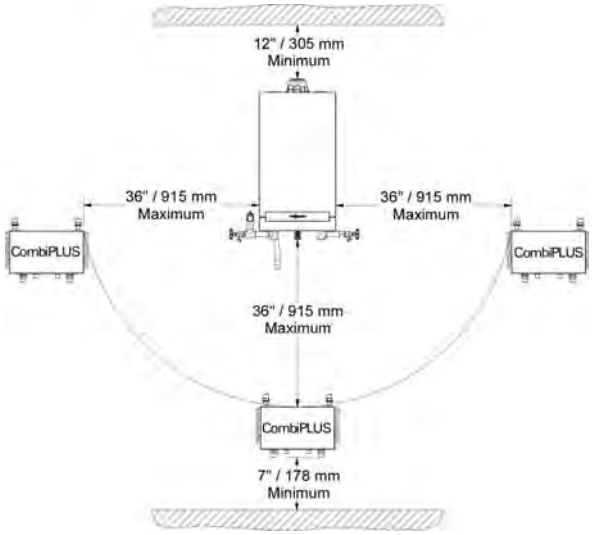
**Legend**

Ⓐ CombiPLUS
Ⓘ Lag bolt (x4)
Ⓙ 1/4″ plain washer (x4)
Ⓚ Anchor (x4)
Ⓣ Template

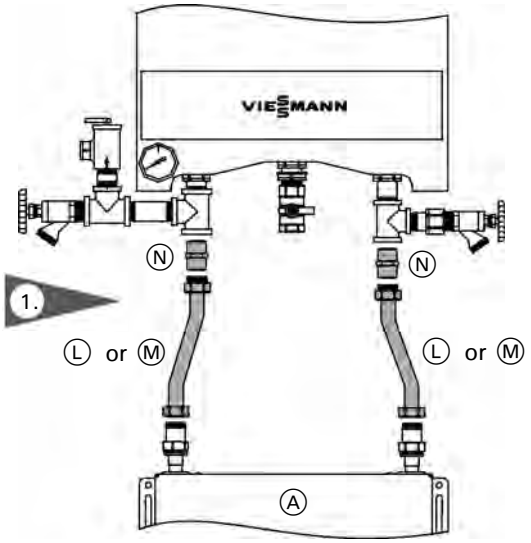
## CombiPLUS Installation Options

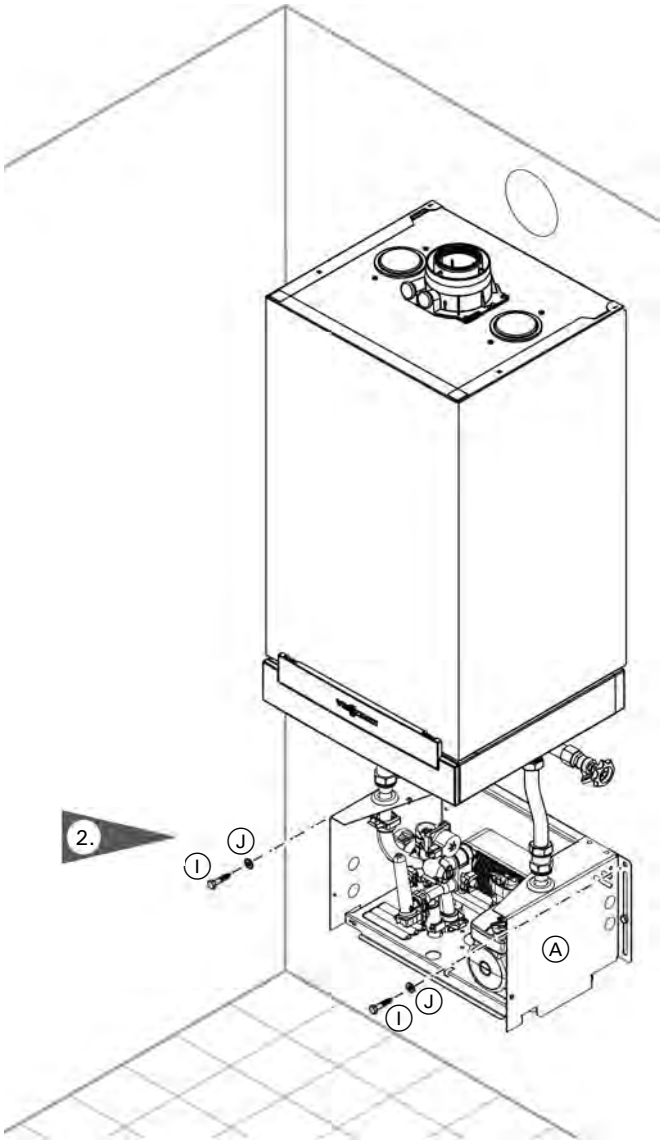
Shown is the maximum distance between the boiler and CombiPLUS using field supplied fittings and pipes.

**Note:** The maximum distance between the boiler and the CombiPLUS is restricted by the communication cable to 36″ (915 mm).



# Connecting the CombiPLUS Piping




Connecting the CombiPLUS Ⓐ using the supplied piping, adaptors and mounting hardware.

1. Install the adaptors Ⓝ to the tees at the bottom of the boiler. Install the flex pipes Ⓛ or Ⓜ to the adaptors Ⓝ.

   Carefully form the flex pipes Ⓛ or Ⓜ to align with the extension fittings on the top of the CombiPLUS Ⓐ.

   **Note:** The flex pipes Ⓛ or Ⓜ must be bent due to the offset in the fittings between the boiler and the CombiPLUS.
   The nominal length of the 7″ flex pipe after bending is 6½″ ± ¼″.
   The nominal length of the optional 12″ flex pipe after bending is 10½″ ± ¼″.

   Slide the CombiPLUS Ⓐ up and install the flex pipes Ⓛ or Ⓜ to the extension fittings of the CombiPLUS Ⓐ.

   **Note:** Ⓛ is a 7″ pipe and Ⓜ is a 12″ pipe.

## IMPORTANT

**DO NOT overtighten the flex pipe fittings.**
**When connecting the flexible pipes do not overtighten the hex nuts. This is a gasketed design and should be hand tightened plus ½ turn with a wrench.**

2. Tighten the two lag bolts located in the CombiPLUS Ⓐ mounting bracket slots.

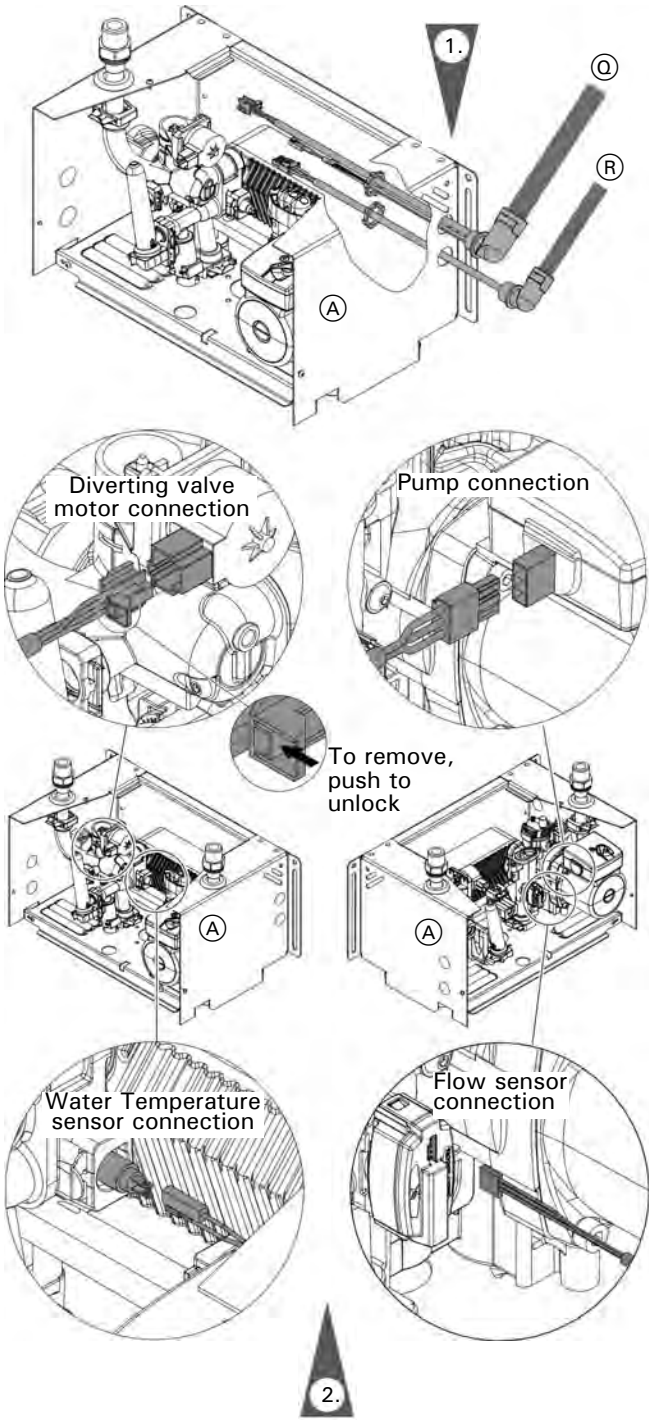
   Install the supplied washers Ⓙ on to the lag bolts Ⓘ.

   Install the lag bolts/washers through the upper mounting holes of the CombiPLUS Ⓐ mounting bracket and into the wall anchors (if used) and tighten.

**Legend**

Ⓐ CombiPLUS
Ⓛ 7″ flex pipe (x2)
Ⓜ 12″ flex pipe (x2) - Optional
Ⓝ ¾″ Adaptor (x2)

# Connecting the CombiPLUS Wiring




Connecting the CombiPLUS Ⓐ wiring using the supplied control and pump cables.

1. Remove both standard knock-outs from the rear right side of the CombiPLUS Ⓐ.

   Route the control cable Ⓠ through one knock-out and the pump cable Ⓡ through the other.

   **Note:** There are optional knock-outs on the front left side of the CombiPLUS Ⓐ (if required).

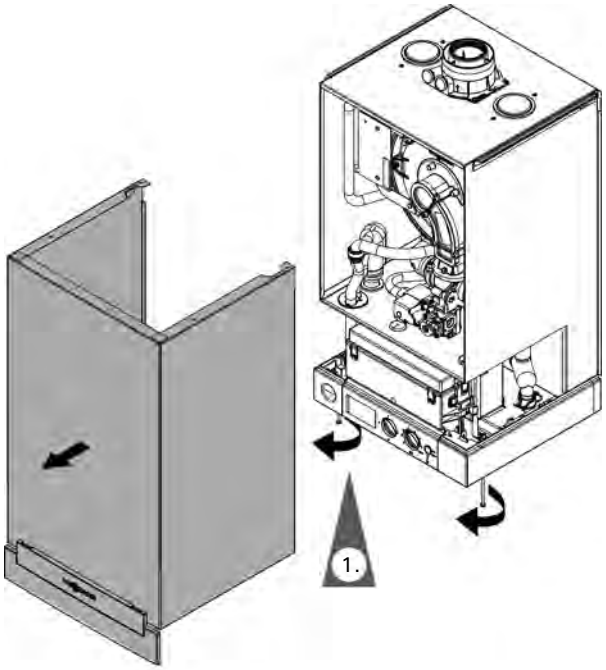
   Secure the cables inside the CombiPLUS Ⓐ using the locknuts provided.

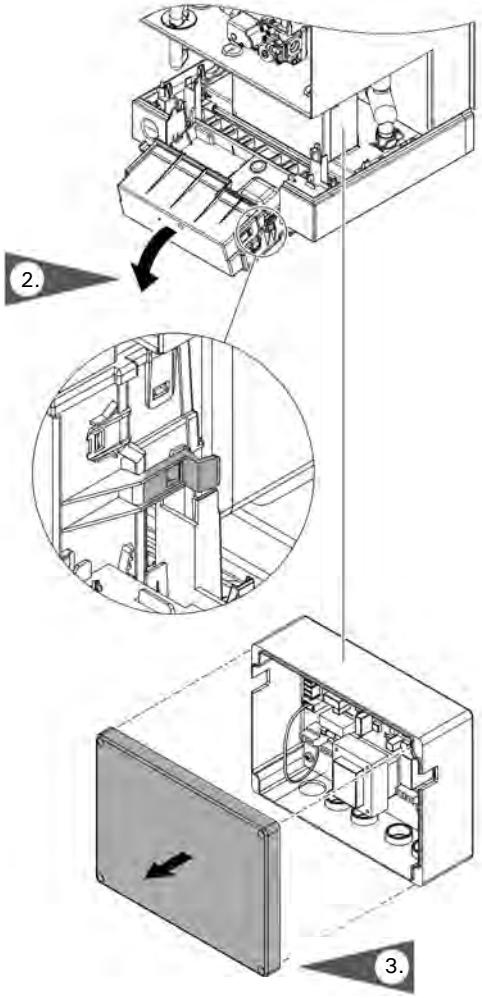
2. Connect the electrical connectors in the CombiPLUS Ⓐ as shown.

**Legend**

Ⓐ CombiPLUS
Ⓠ Control cable
Ⓡ Pump cable

## Accessing the Boiler Controls




Removing the boiler and power pump module covers to provide access to the power pump module.

1. Loosen the boiler housing captive screws (located at the bottom front of the boiler). Remove the cover by pulling straight out from the boiler and set aside.

2. Release and hold the boiler control locks (located on both sides of the boiler) and rotate forward and down.

3. Release the four captive screws on the power pump module cover by rotating them 90 degrees with a Phillips screw driver. Set the cover aside.



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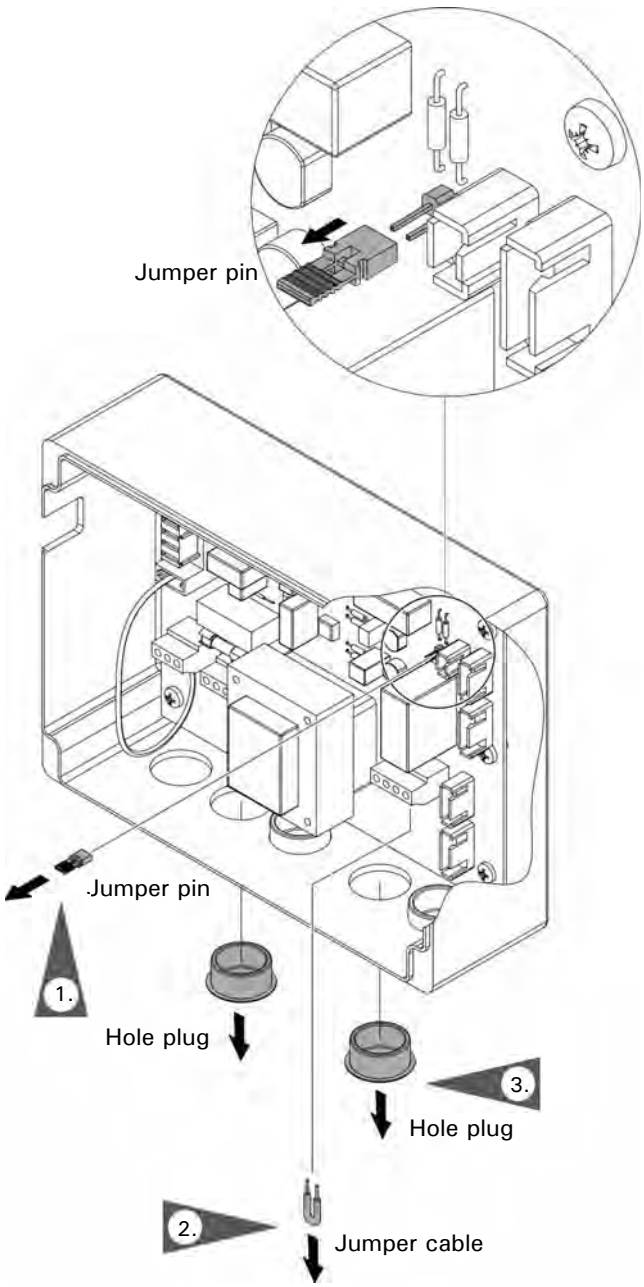
# Preparing the Boiler Power Pump Module




Preparing the power pump module for connection to the CombiPLUS wiring.

When handling static sensitive components, avoid damage caused by static discharge by following Electro-Static Discharge safety procedures.

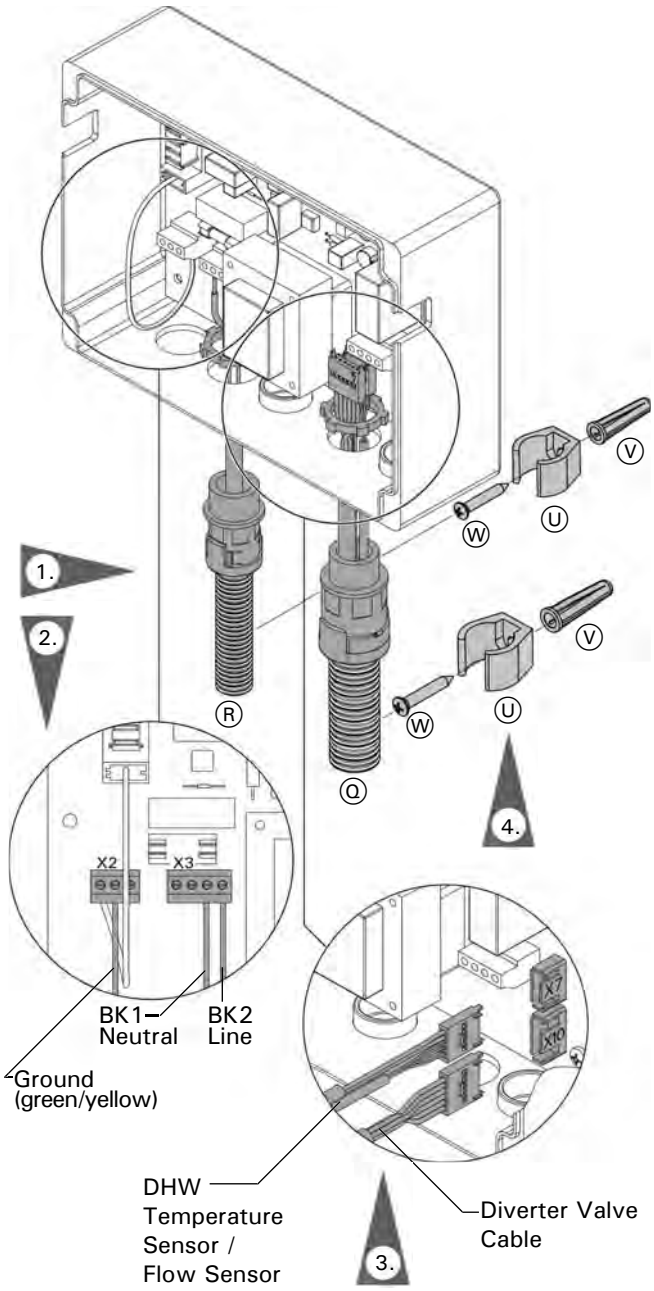
1. Remove the jumper pin from terminal X8 (CombiPLUS) of the power pump module and discard.

2. Remove the jumper cable from terminal block X4 (terminals 3 & 4, room thermostat connection) of the power pump module and discard (for room thermostat connection only).

3. Remove the second and fourth hole plug from the base of the power pump module and discard.

**Note:** Once the CombiPLUS is installed and the jumper pin is removed, if not programmed for use with the CombiPLUS, the boiler will provide DHW heating based on the built-in resistors (DHW input connections of the power pump module). If the jumper pin is not removed the boiler will not provide on demand hot water via the CombiPLUS.
For programming see page 35.

# Connecting the CombiPLUS Cables to the Power Pump Module of the Boiler




**Legend**

BK1 - Black 1 (Neutral)
(BK1 with blue shrink sleeve on pump side)

BK2 - Black 2 (Line)

**Note:** See page 29 for CombiPLUS connections.

Connecting the CombiPLUS cables to the power pump module.

1. Route the control cable Ⓠ through the fourth hole of the power pump module base and route the pump cable Ⓡ through the second hole of the power pump module base.

   Secure the cables inside the power pump module using the locknuts provided.

2. There are three wires to connect on the power pump cable Ⓡ.

   Connect wire BK1 to the power pump neutral of terminal block X3 (as shown).

   Connect wire BK2 to the power pump line of terminal block X3 (as shown).

   Connect the green/yellow ground wire to terminal block X2 (any open terminal).

3. The control cable Ⓠ has two connectors.

   Connect the DHW temperature sensor / flow sensor (five pin connector) to terminal plugin X7.

   Connect the diverter valve (six pin connector) to terminal plugin X10.

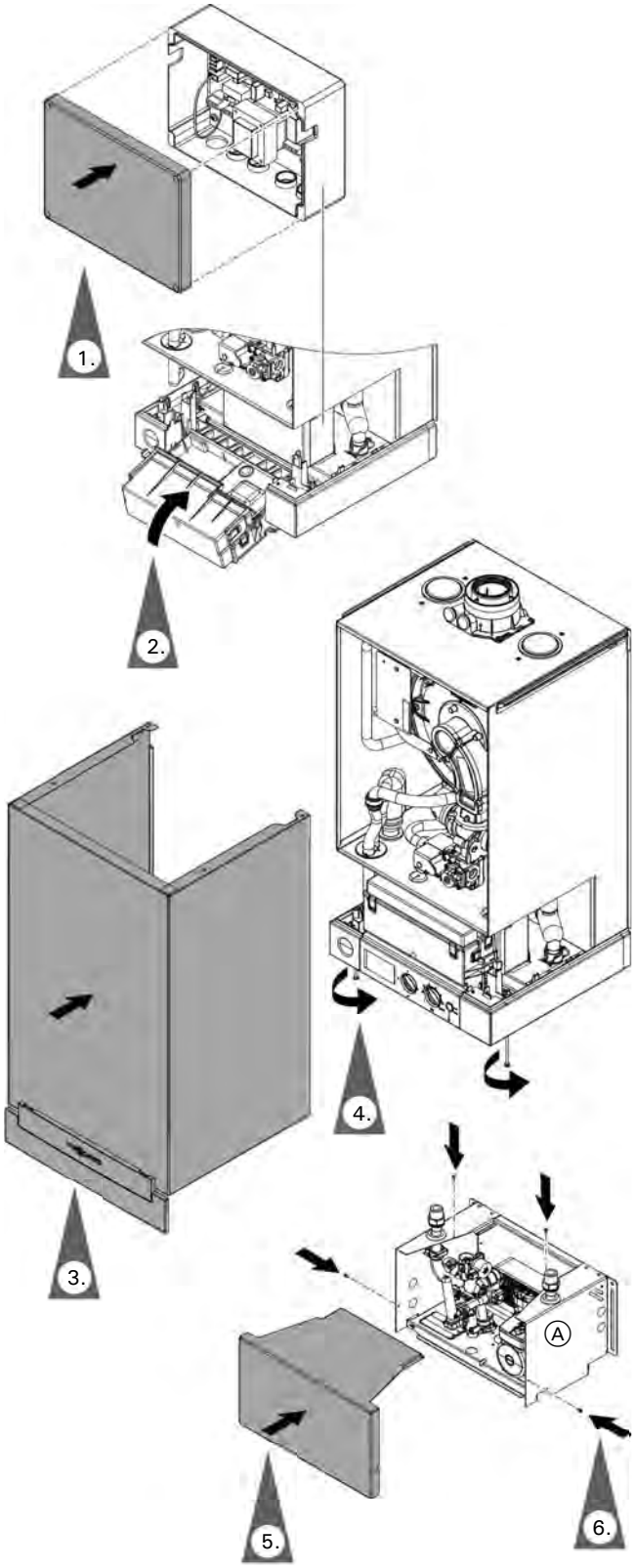
   **Note:** For additional wiring details see the wiring diagram.

4. Install the supplied anchors Ⓥ into the wall behind the cables. Install the conduit clip Ⓤ with the supplied screw Ⓦ into the wall anchor Ⓥ. Press cables Ⓠ and Ⓡ into the conduit clip Ⓤ.

**Legend**

Ⓠ Control cable
Ⓡ Pump cable
Ⓤ Conduit clip
Ⓥ #10 Anchor
Ⓦ #10 Screw

## Re-installing Covers



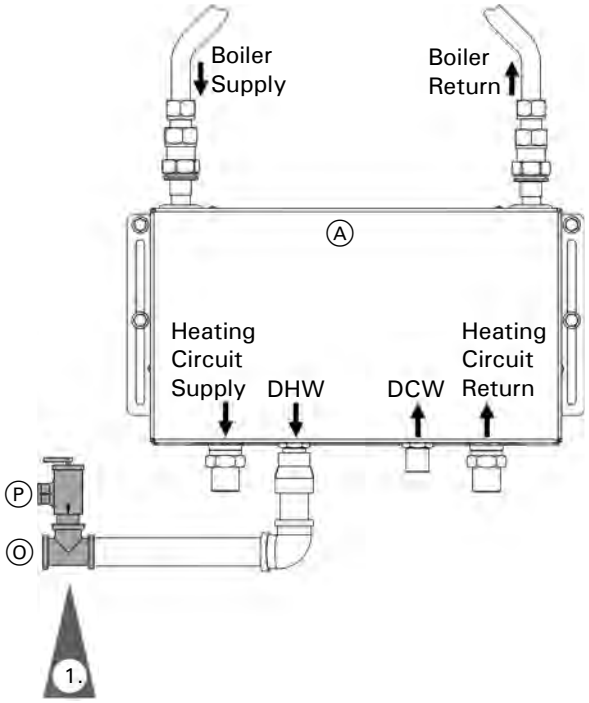

Reinstalling the covers for the boiler, power pump module and the CombiPLUS Ⓐ.

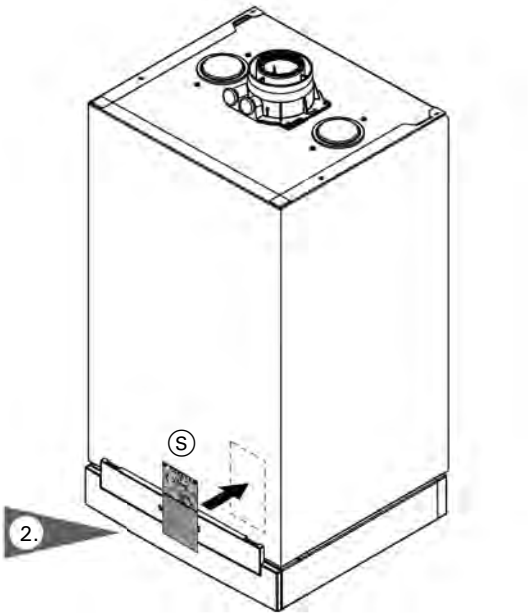
1. Align and install the cover of the power pump module and lock into place by rotating the four captive screws 90 degrees with a Phillips screw driver.
2. Rotate the boiler controls up and in.
   Ensure that the locking clips are engaged.
3. Install the boiler cover by inserting it straight on from the front.
4. Tighten the boiler housing captive screws (located at the bottom front of the boiler).
5. Install the CombiPLUS Ⓐ cover by inserting it straight on from the front.
6. Using a Phillips screw driver, install and tighten all four screws holding the CombiPLUS Ⓐ cover.

**Legend**

Ⓐ CombiPLUS

# Adding PRV and Label




Installing the PRV Ⓟ and tee Ⓞ to the CombiPLUS Ⓐ and label Ⓢ to the boiler.

**Note:** The system must be leak tested.
Refer to the boiler Installation Instructions.

The DHW pressure relief valve is designed to relieve excessive pressure in the system, produced during domestic hot water heating.

Model: Watts No. 3L
Size: ¾" NPT
Max. Operating Pressure: 150 psig
Input Rating: 200 MBH

The installation of the DHW pressure relief valve must be in accordance with local codes. The DHW pressure relief valve must be installed in the domestic hot water supply by a heating contractor. If local codes require a different relief valve, substitute the valve supplied by the manufacturer. The heat exchanger is approved for a max. operating pressure of 150 psig.

The DHW pressure relief valve must be installed in vertical position in the domestic hot water supply as close to the CombiPLUS heat exchanger as possible. Drain pipe (of same diameter as valve outlet) must be routed to safe place of disposal, and must be installed with a downward slope from the valve.
Do not install a shutoff valve between the DHW pressure relief valve and the heat exchanger, or in the drain pipe.

1. Install the 150 psi PRV Ⓟ and tee Ⓞ to the installed field supplied piping from the CombiPLUS Ⓐ.

2. Apply the scald danger label Ⓢ as shown.
   **Note:** This label must be installed as required by national code.

**Legend**

Ⓐ CombiPLUS
Ⓞ ¾" Tee
Ⓟ ¾" PRV, 150 psi
Ⓢ Danger label



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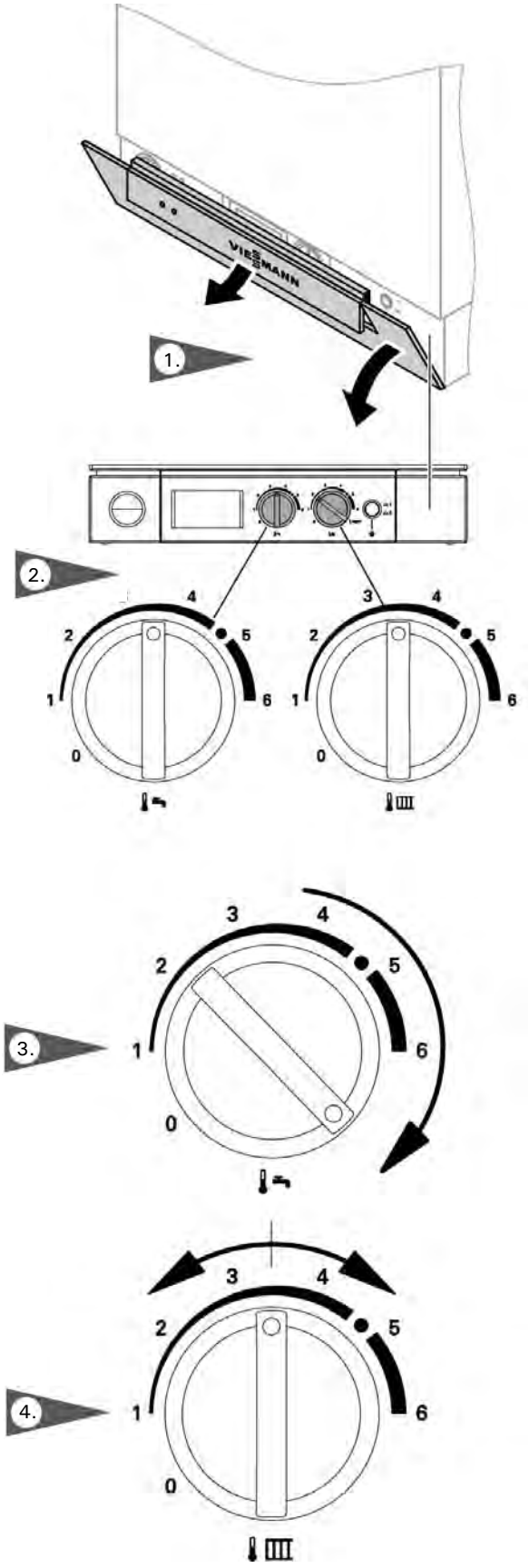
# Programming




Programming the boiler control for operation with or without the CombiPLUS.

**Note:** If an optional CombiPLUS is used, the boiler control must be programmed.

**Note:** For additional programming refer to the boiler Operating, Installation and Service Instructions.

1. Lift flap and pull control unit cover down. All boiler controls are located behind the control unit cover.

2. Simultaneously turn rotary selectors "🌡🚿" and "🌡▥" to their central position. "🚿 and **SERV**" will appear on the screen.

   **Note:** If one (or both) of the rotary selector dials are already in the central position, take it (or them) out of the central position and then simultaneously turn both rotary selectors back to the central position.

3. Turn the rotary selector "🌡🚿" to the control range on the right. "🚿" will appear on the display.

4. Adjust the control by turning the rotary selector "🌡▥". The display shows: "**0**" or "**1**" flashing
   "**1**" boiler with the optional CombiPLUS (right control range).
   "**0**" boiler without optional CombiPLUS (left control range) (factory default setting).

   **Note:** After programming the boiler control to accept the CombiPLUS, wait until the boiler temperature is displayed, then switch the control OFF then ON. ECO will be displayed on the screen.

# Installation Examples

**General**
The schematics on the following pages are to be seen as guidelines only. They further do not display all system varieties, safety devices, or concepts possible. Specific system layouts may be further discussed with the local Viessmann sales representative office.

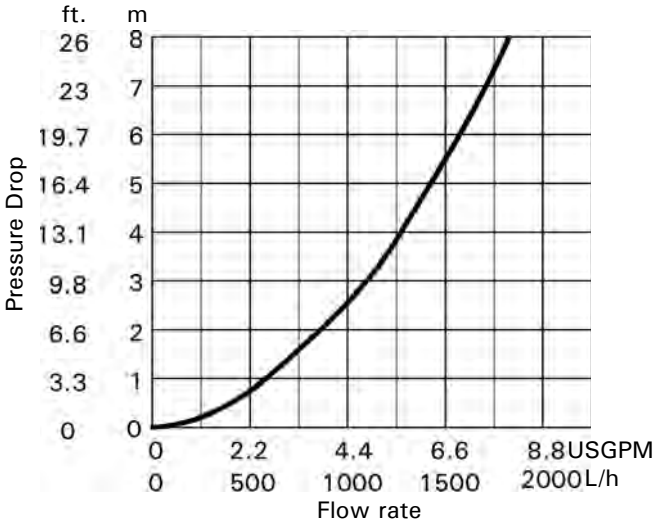
**Clearances**
A minimum of 2" (51 mm) circumferential clearance from non-insulated hot water pipes to combustible construction must be maintained. In cases where the pipes are insulated with pipe insulation of appropriate and sufficient thickness and insulation values, the above clearance may be reduced to 0" (refer to local gas codes).

## CAUTION

**For underfloor heating applications, an additional immersion or strap-on aquastat must be installed in the low temperature underfloor loop (downstream of the mixing valve) to de-energize the pump and/or boiler to prevent overheating. High water temperatures can damage concrete slabs.**

**Pressure drop (primary circuit) of Vitodens 100-W**

The Vitodens 100-W is designed only for closed loop, forced circulation hot water heating systems.




**Typical system flow rates**

| **Model WB1B** | **26** | **35** |
|---|---|---|
| **$\Delta$ t** | | |
| **Output Btu/h** | 83,000 | 108,000 |
| 30°F (17°C) rise (GPM) | 5.5 | ---- |
| 35°F (19.5°C) rise (GPM) | 4.7 | 6.2 |
| 40°F (22°C) rise (GPM) | 4.2 | 5.4 |

**Heating circuit pumps**

Recommended heating pumps with Vitodens 100-W, WB1B 26, 35.

- Grundfos 15-58 (3-speed)
- Taco 00R
  or equivalent

Refer to the graph above for the proper waterside boiler friction loss calculations.

A low-loss header **must** be used when the **system** flow rate exceeds the maximum (or minimum) flow rate of the Vitodens 100-W boiler. An alternative method may be used, such as primary secondary piping using closely spaced tees.
A low-loss header offers additional benefits not provided by a pair of closely spaced tees. Viessmann strongly recommends and prefers the use of a low-loss header over closely spaced tees.

Use standard friction loss method for pipe sizing. Observe boiler maximum and minimum flow rate limitations.
If system flow rate exceeds boiler maximum flow rate (as stated on page 86) or if system flow rate is unknown, Viessmann strongly recommends the installation of a low-loss header. See page 49 for low-loss header information or refer to the Vitodens Venting System Installation Instructions.

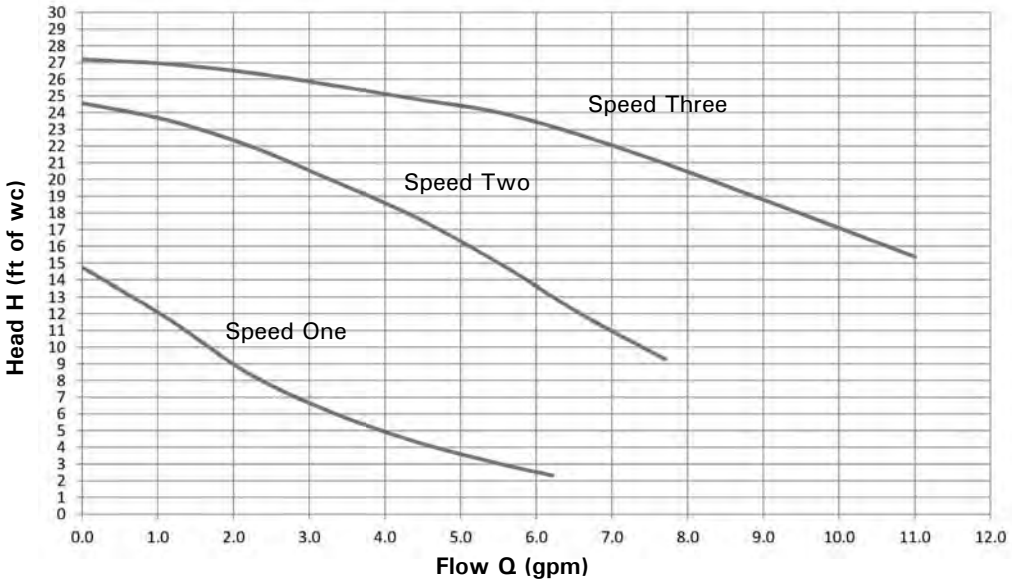
## IMPORTANT

**Pump selection must be based on accurate system flow and pressure drop calculations (incl. DHW sizing).**

## Installation Examples *(continued)*

**CombiPLUS built-in pump**

Grundfos UPS15-78 three speed heating circuit/DHW production pump for Vitodens 100 WB1B 26, 35 boilers (in the factory setting, the pump speed is preset to 'speed three')

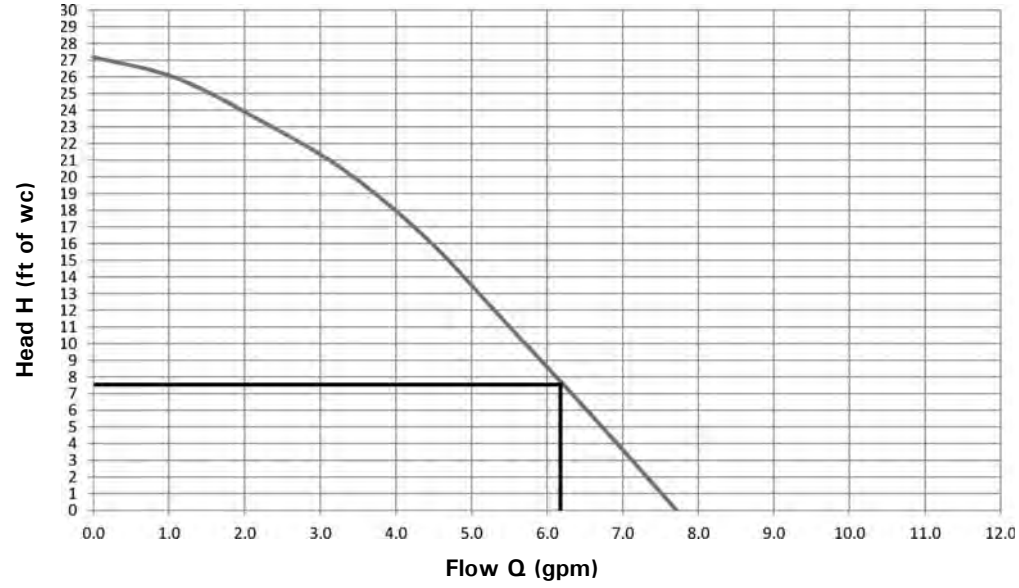



*Performance chart courtesy of Grundfos*

| Pump Model | Grundfos UPS15-78 | |
|---|---|---|
| Rated voltage | VAC | 115 |
| Rated current | A max. | 1.15 |
| | A min. | 0.8 |
| Capacitor | $\mu$F | 8 |
| Power consumption | W max. | 130 |
| | W min. | 80 |

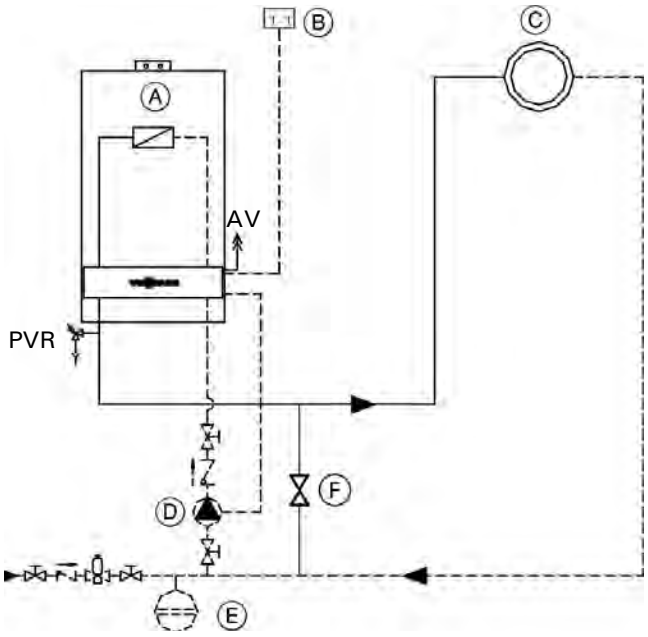
**CombiPLUS built-in pump, Grundfos UPS15-78, residual head pressure**

Residual head of built-in three speed pump used with Vitodens 100 WB1B 26, 35

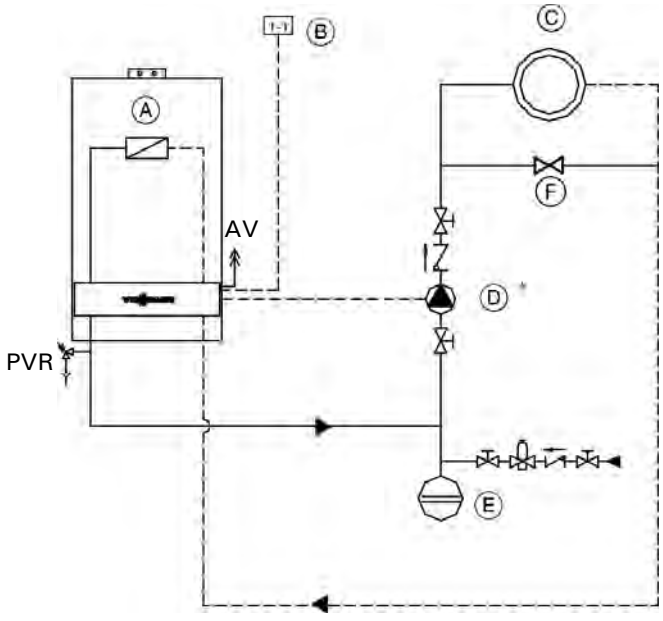


## Installation Examples *(continued)*

**System Layout 1**
Vitodens 100-W, WB1B 26, 35 with...
- one heating circuit




**System Layout 1 - Alternate Option**




**Note:** The use of a low-loss header is recommended if the water flow rate is less than 1.7 GPM (400 L/h) or more than 6.2 GPM (1400 L/h).
The low-loss header is available as an accessory part.

**Legend**

AV Air vent
PRV Pressure relief valve

Ⓐ Vitodens 100-W
Ⓑ Room thermostat
Ⓒ Heating circuit
Ⓓ Heating circuit pump (field supplied)
Ⓔ Expansion tank
Ⓕ Pressure Activated By-Pass

**Note:** Heating circuit C in the examples should be designed to 30°F to 40°F (16.7°C to 22.2°C). For a lesser Δ t design, the system layout designer must use one of the examples (3 or 4) on the following pages.

## IMPORTANT

**Ensure that a pressure activated by-pass is installed if there are system component(s) in Ⓒ that may isolate the flow to the pump Ⓓ.**

**Maximum Flow Rates**

| **Model WB1B** | **26** | **35** |
|---|---|---|
| **Δ t** | | |
| **Output Btu/h** | 83,000 | 108,000 |
| 30°F (17°C) rise (GPM) | 5.5 | ---- |
| 35°F (19.5°C) rise (GPM) | 4.7 | 6.2 |
| 40°F (22°C) rise (GPM) | 4.2 | 5.4 |



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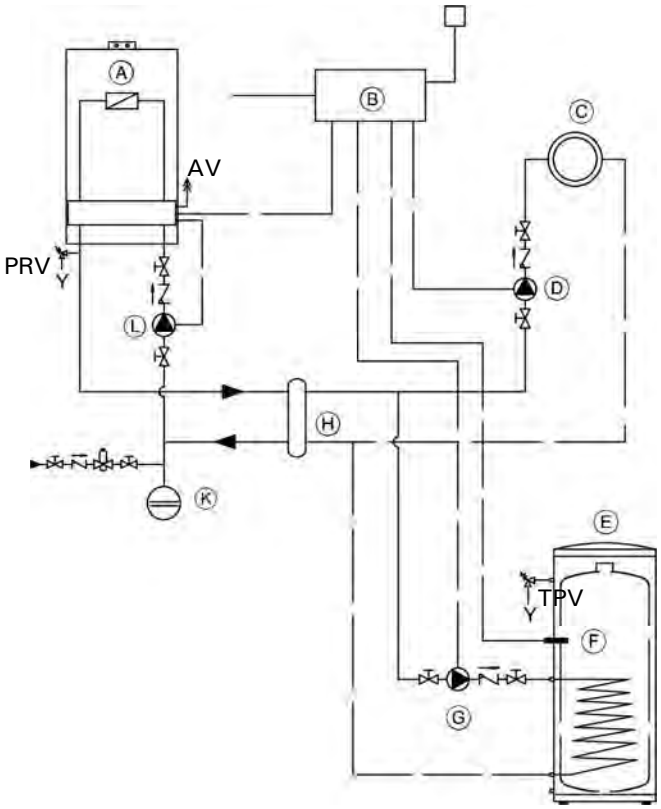
## Installation Examples *(continued)*

**System Layout 2**
Vitodens 100-W, WB1B 26, 35 with...
- DHW storage tank
- low-loss header
- one heating circuit




**Legend**

AV Air vent
PRV Pressure relief valve
TPV Temperature and pressure relief valve

Ⓐ Vitodens 100-W gas-fired condensing boiler
Ⓑ External boiler/DHW controller (field supplied)
Ⓒ Heating circuit
Ⓓ Heating circuit pump (field supplied)
Ⓔ DHW storage tank
Ⓕ DHW tank temperature aquastat or sensor
Ⓖ DHW circulating pump field supplied)
Ⓗ Low-loss header
Ⓚ Expansion tank
Ⓛ Primary pump (boiler circuit, field supplied) with low-loss header only

**Maximum Flow Rates**

| **Model WB1B** | **26** | **35** |
|---|---|---|
| **∆ t** | | |
| **Output Btu/h** | 83,000 | 108,000 |
| 30°F (17°C) rise (GPM) | 5.5 | ---- |
| 35°F (19.5°C) rise (GPM) | 4.7 | 6.2 |
| 40°F (22°C) rise (GPM) | 4.2 | 5.4 |

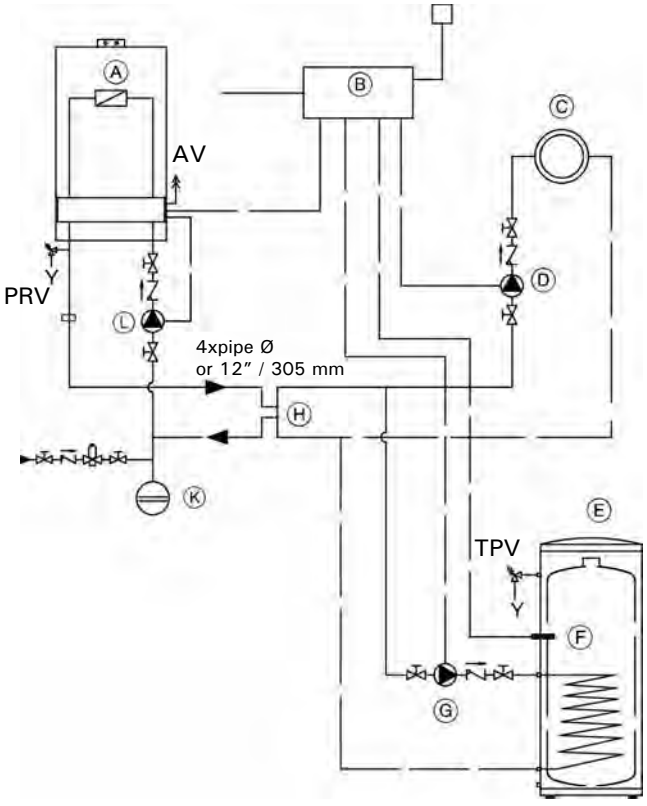
## IMPORTANT

**Primary pump Ⓛ must pump into the boiler (as illustrated).**

**Note:** The use of a low-loss header is recommended if the water flow rate is less than 1.7 GPM (400 L/h) or more than 6.2 GPM (1400 L/h).
The low-loss header is available as an accessory part. See page 49 in this manual for details on the low-loss header.

## Installation Examples *(continued)*

**System Layout 3**
Vitodens 100-W, WB1B 26, 35 with...
- DHW storage tank
- one heating circuit




**Legend**

AV Air vent
PRV Pressure relief valve
TPV Temperature and pressure relief valve

Ⓐ Vitodens 100-W gas-fired condensing boiler
Ⓑ External boiler/DHW controller (field supplied)
Ⓒ Heating circuit
Ⓓ Heating circuit pump (field supplied)
Ⓔ DHW storage tank
Ⓕ DHW tank temperature aquastat or sensor
Ⓖ DHW circulating pump (field supplied)
Ⓗ Closely spaced tees, 4x pipe Ø or 12" (305 mm)*
Ⓚ Expansion tank
Ⓛ Primary pump (boiler circuit, (field supplied)

*A low-loss header offers additional benefits not provided by a pair of closely spaced tees. Viessmann strongly recommends and prefers the use of a low-loss header over closely spaced tees. Please see page 36 for details.

**Maximum Flow Rates**

| **Model WB1B** | **26** | **35** |
|---|---|---|
| **Δ t** | | |
| **Output Btu/h** | 83,000 | 108,000 |
| 30°F (17°C) rise (GPM) | 5.5 | ---- |
| 35°F (19.5°C) rise (GPM) | 4.7 | 6.2 |
| 40°F (22°C) rise (GPM) | 4.2 | 5.4 |

## IMPORTANT

**Primary pump Ⓛ must pump into the boiler (as illustrated)**

**Note:** The use of a low-loss header is recommended if the water flow rate is less than 1.7 GPM (400 L/h) or more than 6.2 GPM (1400 L/h).
The low-loss header is available as accessory part. See page 49 in this manual for details on the low-loss header.



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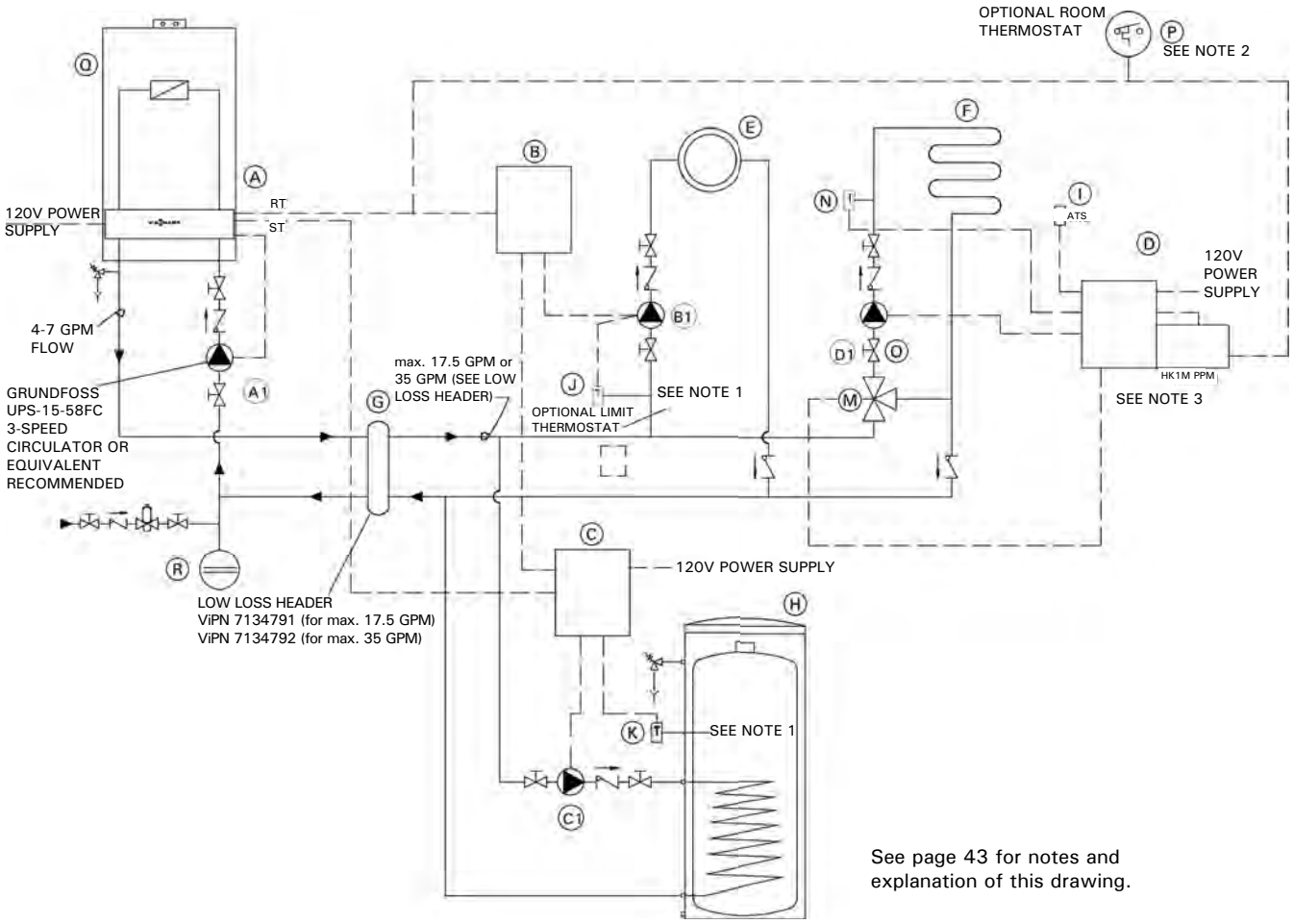
## Installation Examples *(continued)*

**System Layout 4**

Vitodens 100-W, WB1B 26, 35 with...

- DHW storage tank
- Low-loss header
- one high-temperature heating circuit
- one low-temperature heating circuit
- Viessmann Vitotronic 050, HK1M controller



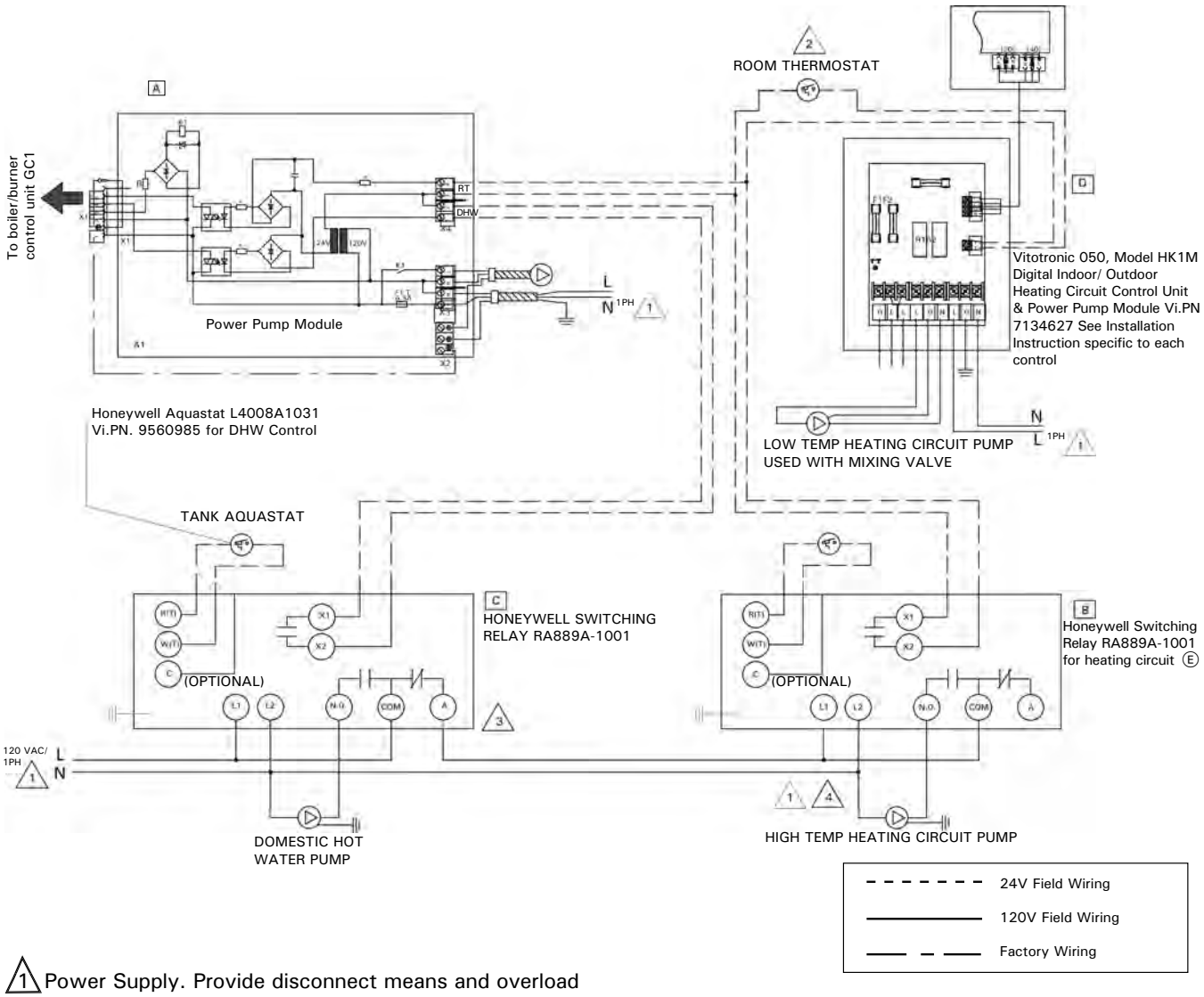

See page 43 for notes and explanation of this drawing.

**Legend**

- Ⓐ Boiler power pump module
- Ⓐ1 Primary pump (boiler power / pump module control) (field supplied)
- Ⓑ Honeywell switching relay for
- Ⓑ1 Heating circuit pump (field supplied)
- Ⓒ Honeywell switching relay for DHW Ⓗ control
- Ⓒ1 DHW circulating pump (field supplied)
- Ⓓ Vitotronic 050, Model HK1M Digital indoor / outdoor heating circuit control unit & pump control Vi. Part No. 7134 627
- Ⓓ1 Heating circuit pump (field supplied)
- Ⓔ Radiator heating circuit
- Ⓕ Underfloor heating circuit
- Ⓖ Low loss header
  -Max. flow 17.5 USGPM Vi. Part No. 7134 791
  -Max. flow 35 USGPM Vi. Part No. 7134 792
- Ⓗ DHW indirect storage tank
- Ⓘ Outdoor temperature sensor
- Ⓙ Limit thermostat (optional) See note 1
- Ⓚ DHW tank aquastat, Honeywell Part No. L4008A1031, Vi. Part No. 9560 985
- Ⓜ Mixing valve motor / control
- Ⓝ Mixing valve supply temperature sensor
- Ⓞ Viessmann mixing valve
- Ⓟ Room thermostat (optional) See note 2.
- Ⓠ Vitodens 100 boiler
- Ⓡ Expansion tank

## Installation Examples *(continued)*

**Wiring diagram for system layout 4**


ROOM THERMOSTAT
To boiler/burner control unit GC1
Power Pump Module
RT
DHW
Vitotronic 050, Model HK1M Digital Indoor/ Outdoor Heating Circuit Control Unit & Power Pump Module Vi.PN 7134627 See Installation Instruction specific to each control
Honeywell Aquastat L4008A1031 Vi.PN. 9560985 for DHW Control
LOW TEMP HEATING CIRCUIT PUMP USED WITH MIXING VALVE
TANK AQUASTAT
HONEYWELL SWITCHING RELAY RA889A-1001
(OPTIONAL)
Honeywell Switching Relay RA889A-1001 for heating circuit Ⓔ
(OPTIONAL)
120 VAC/ 1PH
DOMESTIC HOT WATER PUMP
HIGH TEMP HEATING CIRCUIT PUMP
24V Field Wiring
120V Field Wiring
Factory Wiring

1 Power Supply. Provide disconnect means and overload protection as required

2 The heating circuit pump logic output of Vitotronic 050 is used to energize the TT output of PPM. Therefor using a room thermostat in series with RT input of the boiler will reduce unnecessary calls initiated by pump logic output of the Vitotronic to the Vitodens 100 boiler

3 DHW has priority over heating circuit Ⓔ (see also 4) and NO PRIORITY over Heating Circuit Ⓕ (mixing valve)

4 If no priority is required for DHW demand, supply power to terminals L1, L2 of RA889A relay of heating circuit Ⓔ B



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## Installation Examples *(continued)*

**System Layout 4**

Installation of heating circuits:
- radiator heating circuit (high temperature circuit)
- underfloor heating circuit with 3-way mixing valve (low temperature circuit)
- DHW production with the following flow conditions:

The flow rate of the heating circuits is greater than the maximum possible water flow rate of the Vitodens 100 boiler.

The use of a low-loss header is therefore recommended. A low-loss header is available as an accessory part.

The radiator heating circuit is supplied by a circulation pump (field supplied). The underfloor heating circuit is supplied by a circulation pump installed on site which is controlled by the extension kit. The DHW pump is field supplied.

**Note:** The use of a low-loss header is recommended if the water flow rate is less than 1.7 GPM (400 L/h) or more than 6.2 GPM (1400 L/h).
The low-loss header is available as accessory part. See page 49 in this manual for details on the low-loss header.

**Maximum Flow Rates**

| **Model WB1B** | **26** | **35** |
|---|---|---|
| **$\Delta$ t** | | |
| **Output Btu/h** | 83,000 | 108,000 |
| 30°F (17°C) rise (GPM) | 5.5 | ---- |
| 35°F (19.5°C) rise (GPM) | 4.7 | 6.2 |
| 40°F (22°C) rise (GPM) | 4.2 | 5.4 |

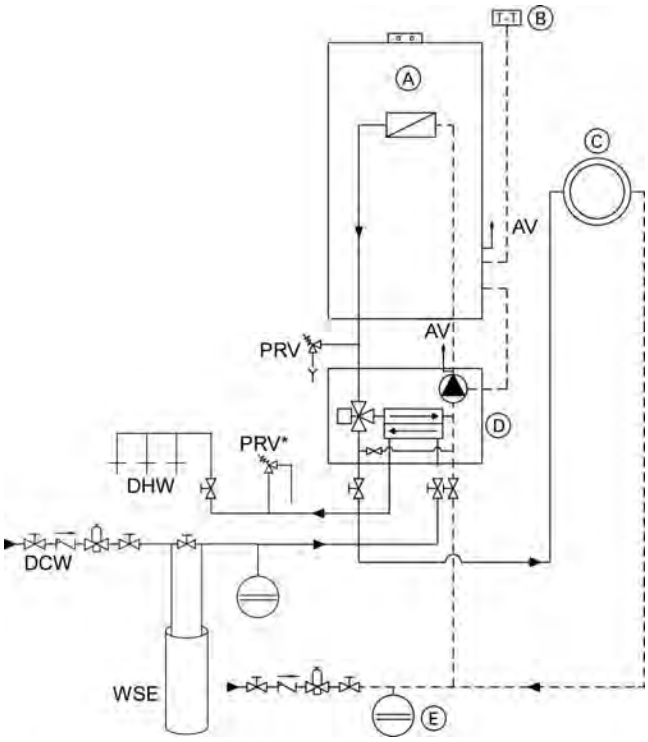
**Note 1**
Optional high limit safety control of heating circuit Ⓔ.
[During DHW production with DHW terminal activated, the boiler supply temperature will be set automatically to 172°F (78°C)].
The heating system must be protected from excessive temperature if no automatic mixing valves are used or no DHW priority is required.
After the DHW call for heat is satisfied, there is a 20 second pump post-purge time.

**Note 2**
The heating circuit pump logic output of the Vitotronic 050 is used to energize the RT (room thermostat) output of power / pump module.
Therefore, using a room thermostat in series with RT (room thermostat) input of the boiler will reduce unnecessary calls initiated by the pump logic output of the Vitotronic to the Vitodens 100 boiler (mixing valve heating circuit only).

**Note 3**
During DHW call for heat, there is no priority on mixing valve heating circuit.

## Installation Examples *(continued)*

Vitodens 100-W, WB1B 26, 35 with one heating circuit and the CombiPLUS




**Maximum Flow Rates**

| **Model WB1B** | **26** | **35** |
|---|---|---|
| **∆ t** | | |
| **Output Btu/h** | 83,000 | 108,000 |
| 30°F (17°C) rise (GPM) | 5.5 | ---- |
| 35°F (19.5°C) rise (GPM) | 4.7 | 6.2 |
| 40°F (22°C) rise (GPM) | 4.2 | 5.4 |

**Note:** The use of a low-loss header is recommended if the water flow rate is less than 1.7 GPM (400 L/h) or more than 6.2 GPM (1400 L/h).
The low-loss header is available as accessory part.

Built-in pump residual head for the heating system side is 6.0 ft. of water column at the boiler maximum flow rate of 6.2 GPM.

**Note:** Heating circuit C in the examples should be designed to 30°F to 40°F (16.7°C to 22.2°C).
For lesser delta T design, system layout designer must use one of the examples (5 or 6) on the following pages.

**Legend**

AV Air vent
PRV Pressure relief valve (boiler)
PRV* Pressure relief valve (DHW 150 psi)
WSE Water softner equipment
Ⓐ Vitodens 100-W
Ⓑ Room thermostat
Ⓒ Heating circuit
Ⓓ CombiPLUS
Ⓔ Expansion tank



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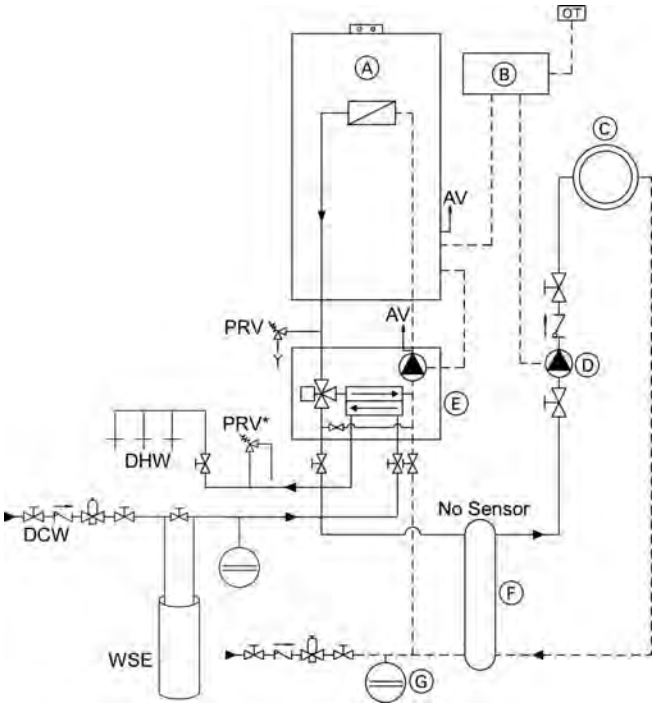
## Installation Examples *(continued)*

Vitodens 100-W, WB1B 10-26, 10-35 with...
- CombiPLUS Kit
- low-loss header
- one heating circuit




**Legend**

AV Air vent
PRV Pressure relief valve (boiler)
PRV* Pressure relief valve (DHW 150 psi)
WSE Water softner equipment
Ⓐ Vitodens 100-W gas-fired condensing boiler
Ⓑ External boiler / system controller (field supplied)
Ⓒ Heating circuit
Ⓓ Heating circuit pump (field supplied)
Ⓔ CombiPLUS
Ⓕ LLH
Ⓖ Expansion tank

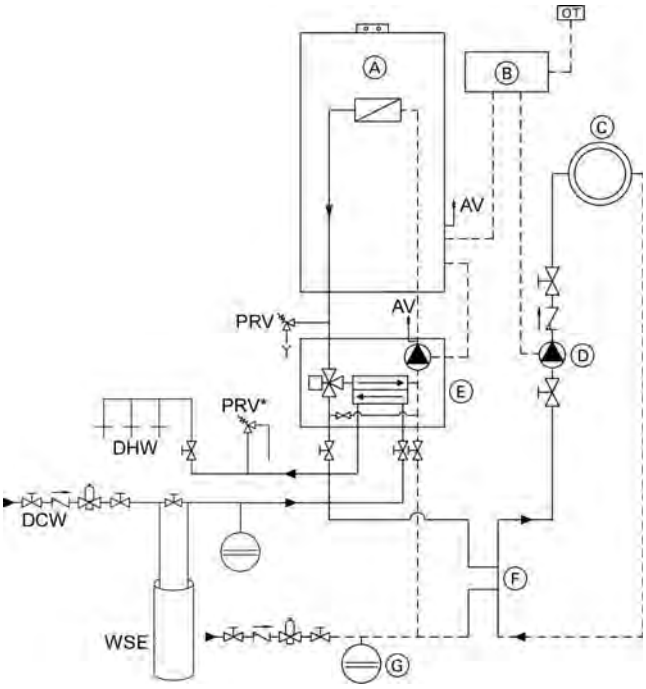
**Note:** The use of a low-loss header is recommended if the water flow rate is less than 1.7 GPM (400 L/h) or more than 6.2 GPM (1400 L/h).
The low-loss header is available as accessory part.

**Maximum Flow Rates**

| **Model WB1B** | **26** | **35** |
|---|---|---|
| **Δ t** | | |
| **Output Btu/h** | 83,000 | 108,000 |
| 30°F (17°C) rise (GPM) | 5.5 | ---- |
| 35°F (19.5°C) rise (GPM) | 4.7 | 6.2 |
| 40°F (22°C) rise (GPM) | 4.2 | 5.4 |

## Installation Examples *(continued)*

Vitodens 100-W, WB1B 10-26, 10-35 with CombiPLUS and one heating circuit without LLH




**Legend**

AV Air vent
PRV Pressure relief valve (boiler)
PRV* Pressure relief valve (DHW 150 psi)
WSE Water softner equipment
Ⓐ Vitodens 100-W gas-fired condensing boiler
Ⓑ External system controller (field supplied)
Ⓒ Heating circuit
Ⓓ Heating circuit pump (field supplied)
Ⓔ CombiPLUS
Ⓕ Closely spaced tees, 4x pipe Ø or 12" (305 mm)*
Ⓖ Expansion tank

* A low-loss header offers additional benefits not provided by a pair of closely spaced tees. Viessmann strongly recommends and prefers the use of a low-loss header over closely spaced tees. See page 49 for details.

**Note:** The use of a low-loss header is recommended if the water flow rate is less than 1.7 GPM (400 L/h) or more than 6.2 GPM (1400 L/h).
The low-loss header is available as an accessory part.

**Maximum Flow Rates**

| **Model WB1B** | **26** | **35** |
|---|---|---|
| **∆ t** | | |
| **Output Btu/h** | 83,000 | 108,000 |
| 30°F (17°C) rise (GPM) | 5.5 | ---- |
| 35°F (19.5°C) rise (GPM) | 4.7 | 6.2 |
| 40°F (22°C) rise (GPM) | 4.2 | 5.4 |



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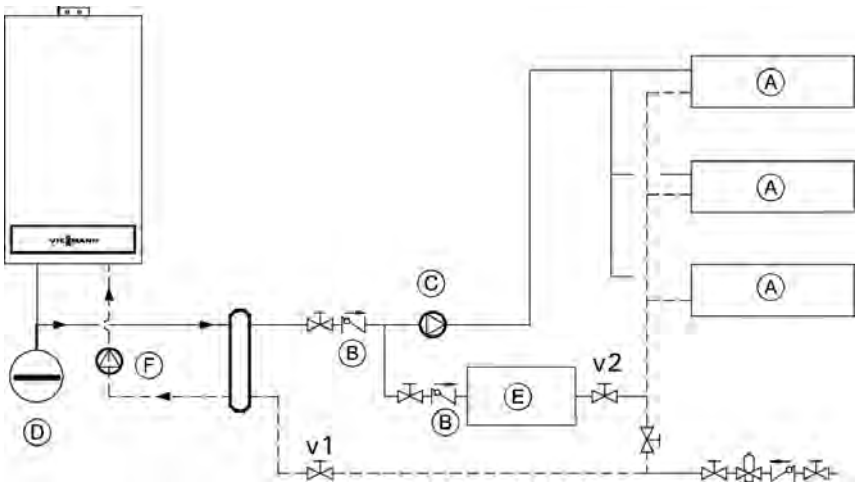
## Installation Examples *(continued)*

**Boiler in heating/cooling application**




**Legend**

Ⓐ Heating/Cooling unit
Ⓑ Spring-loaded flow check valve
Ⓒ Circulation pump
Ⓓ Expansion tank
Ⓔ Water chiller
Ⓕ Boiler circuit pump (field supplied)

### IMPORTANT

**Viessmann strongly suggests that the valves pictured above be labelled "v1" and "v2".**

The boiler, when used in connection with a refrigeration system, must be installed ensuring the chilled medium is piped in parallel to the boiler with appropriate valves to prevent the chilled medium from entering the boiler.

The boiler piping system of a hot water heating boiler connected to heating coils located in air handling units where they may be exposed to refrigerated air circulation must be equipped with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

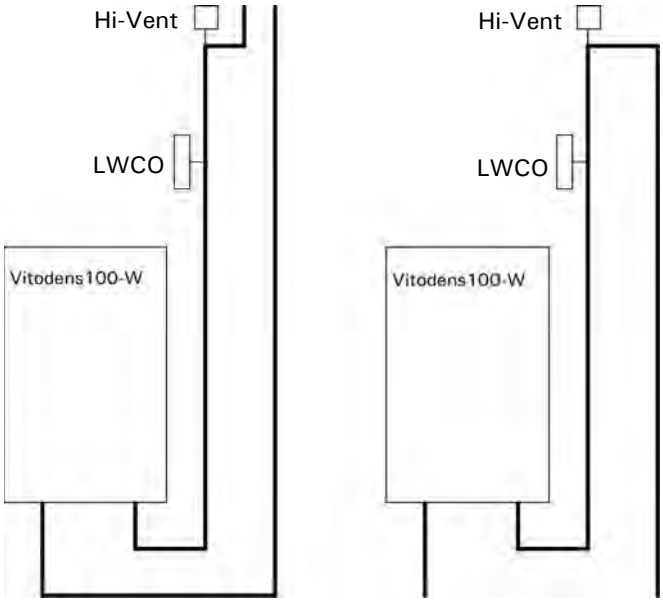
Check installation instructions of the chiller manufacturer carefully for additional requirements.

**Cooling season starts:**
Close valve v1 and open valve v2.

**Heating season starts:**
Close valve v2 and open valve v1.

## Installation Examples *(continued)*

**Boiler with low water cut-off (remote-mounted, field supplied)**




*Boiler below radiation* *Boiler above radiation*

A low water cut-off may be required by local codes. If boiler is installed above radiation level, a low water cut-off device of approved type (field supplied) must be installed in all instances at the highest point of the piping system. Do **not** install an isolation valve between boiler and low water cut-off.

Follow the installation instructions of the low water cut-off manufacturer.

For low water cut-off wiring information specific to your application, refer to applicable wiring diagram on the boiler front panel.

**Note:** The Vitodens 100-W boiler has a built-in flow switch, which may be accepted by local codes in lieu of a low water cut-off.



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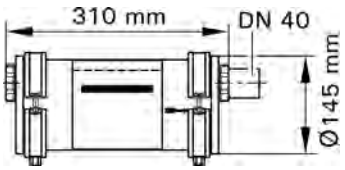
# Installation Examples *(continued)*

**Accessories for the Vitodens 100-W**

Neutralization Unit for Single-Boiler Applications with neutralizing granulate for Vitodens 100-W, WB1B 26, 35
Part No. 7134 231




**Low-Loss Header**

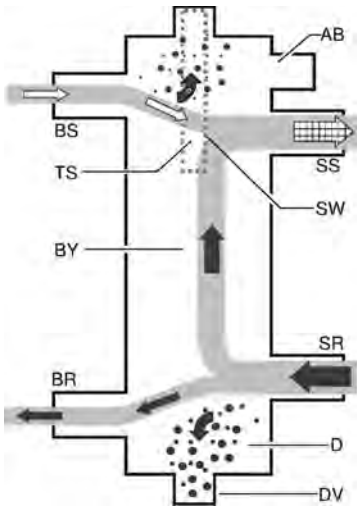
- Type 80/50, Part No. 7134 791
  [max. flow rate 17.6 GPM (4 m³/h)]
- Type 120/80, Part No. 7134 792
  [max. flow rate 35.2 GPM (8 m³/h)]

A low-loss header offers additional benefits not provided by a pair of closely spaced tees. Viessmann strongly recommends and prefers the use of a low-loss header over closely spaced tees. When used in conjunction with the Vitodens 100-W boiler, the low-loss header acts as hydraulic break, decoupling boiler and system circuits from each other (no sensor required). It is recommended to use the low-loss header in applications in which the total system flow rate exceeds the maximum or falls below the minimum flow rate of the Vitodens 100-W boiler.

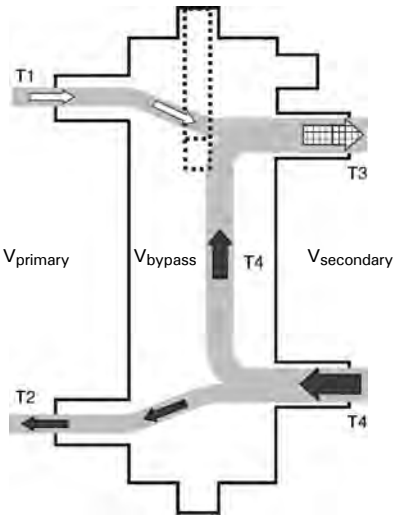
For maximum boiler flow rates, see the table on page 87 in this manual.

Viessmann strongly recommends the use of a low-loss header in cases where the system head and flow rates are unknown.

In addition, the low-loss header helps eliminate air and debris [D] from the heating system. See illustrations for Low-loss header design and the principle of operation.
Product may not look exactly as illustrated.




*Low-loss header design*




*Principal of operation*

The low-loss header is available in the following sizes. Select the size based on the maximum system flow rate of your application.

| Model No. | Max. system flow rate |
|---|---|
| Type 80/50 | 17.6 GPM (4 m³/h) |
| Type 120/80 | 35.2 GPM (8 m³/h) |

**Legend**

| | | | |
|---|---|---|---|
| AB | Air Bleed | DV | Drain Valve |
| BR | Boiler Return | SR | System Return |
| BS | Boiler Supply | SS | System Supply |
| BY | Bypass (with laminar flow) | TS | Viessmann Temp. Sensor (not used) |
| D | Debris and/or air | SW | Sensor Well |
| T1 | Boiler supply temp. | T3 | System supply temp. |
| T2 | Boiler return temp. | T4 | System return temp. |

$V_{primary}$ Boiler circuit flow rate
$V_{secondary}$ Heating circuit flow rate
$V_{bypass}$ Bypass flow rate
$Q_{primary}$ Heat supplied by boiler
$Q_{secondary}$ Heat consumed by system

$V_{primary} < V_{secondary}$
$T1 > T3$
$T2 = T4$
$Q_{primary} = Q_{secondary}$

T1 176°F (80°C)
$V_{secondary} = V_{primary} + V_{bypass}$

## IMPORTANT

**When installing a low-loss header, system mixed supply temperature (T3) must be calculated as follows**

$$T3 = \frac{T1 \times V_{primary} + T4\ V_{bypass}}{V_{secondary}}$$

*Product may not look exactly as illustrated.*

## Venting Connection

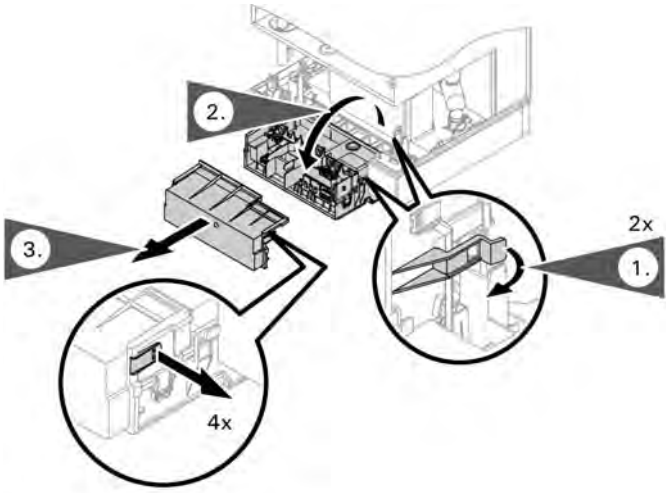
### ⚠ CAUTION

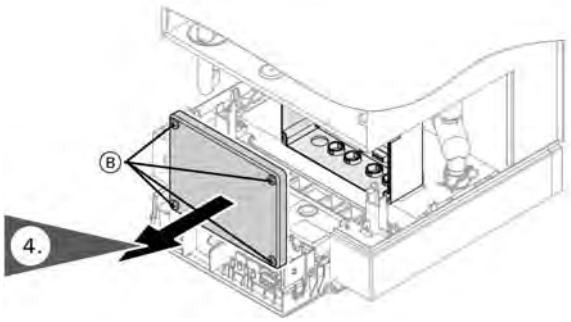
**Under certain climatic conditions some building materials may be affected by flue products expelled in close proximity to unprotected surfaces. Sealing or shielding of the exposed surfaces with a corrosion resistant material (e.g. aluminum sheeting) may be required to prevent staining or deterioration. The protective material should be attached and sealed (if necessary) to the building before attaching the vent termination. It is strongly recommended to install the vent termination on the leeward side of the building.**

*For detailed installation information and specific venting requirements, reference the Vitodens Venting System Installation Instructions supplied with the boiler.*

## Electrical Connections

**Rotating the control unit and opening the power/pump module**




1. Loosen the screws underneath the boiler but do not remove them. Remove the cover (as shown on page 17).
2. Pull tabs outwards.
3. Flip control unit down.
4. Remove cover by releasing tabs if necessary.
5. Unlock 4 spring-loaded lock screws Ⓑ and remove cover plate of the power pump module.

### IMPORTANT

**Both the control unit and the power pump module have labels and stickers containing important information. Read and follow their respective instructions.**

### IMPORTANT

**The ON / OFF switch located on the boiler does not disconnect power to power / pump module, therefore the main service switch or breaker must be turned off.**

**Note on connection of accessories**

*For other required installation steps, please reference the Installation Instructions for the accessory part.*



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## Electrical Connections *(continued)*

### IMPORTANT

**Remove short factory test leads from terminal L, N and Ground before connecting main power supply to boiler Ⓐ.**

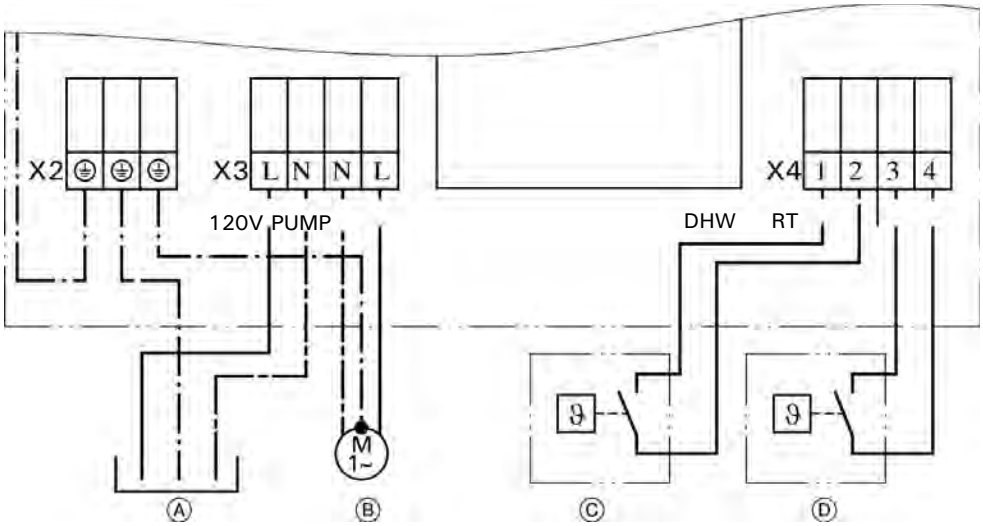
### IMPORTANT

**Ensure that pressure activated by-pass is installed with system layout 1 on page 38.**

**Electrical connections to the power pump module (room thermostat and DHW)**

**Note:** Boilers are factory shipped with a wiring diagram (11"x17" sheet inside a pouch) attached to the inside of the front cover. The wiring diagram shipped with the boiler supercedes the wiring information in this manual.

Provide a main power disconnect / service switch as per local code requirements. Also refer to wiring diagram on page 91.




**Legend**

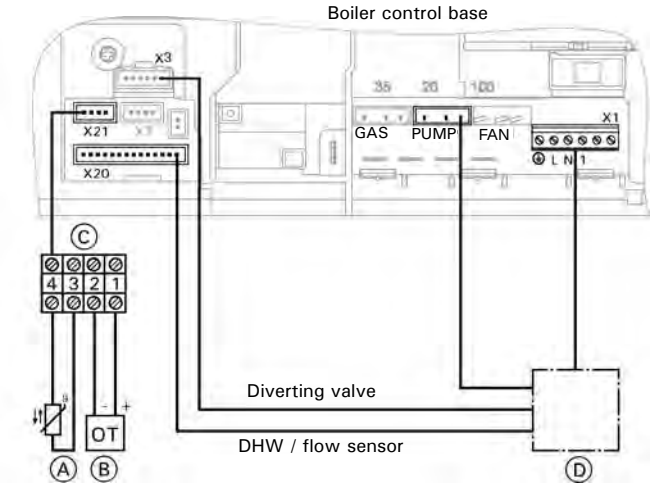
Ⓐ Main power supply (120V, 60Hz, 1 PH).

Ⓑ Heating circuit pump (or boiler pump for low-loss header application or CombiPLUS pump).

Ⓒ DHW tank temperature controller / external heat demand (field supplied) (not used with the CombiPLUS kit).

Ⓓ Room temperature thermostat (Anticipator setting 0.2A) (field supplied).

**Optional operating control - OpenTherm**




**What is OpenTherm?**
The OpenTherm (OT) protocol is a point-to-point communication system, which connects a boiler with a room controller or other devices. The room unit calculates a heating demand (water temperature request) and transmits it to the boiler. The boiler will adjust the heat input accordingly (low-high modulation).

**Legend**

Ⓐ Viessmann outdoor temperature sensor (field wiring)

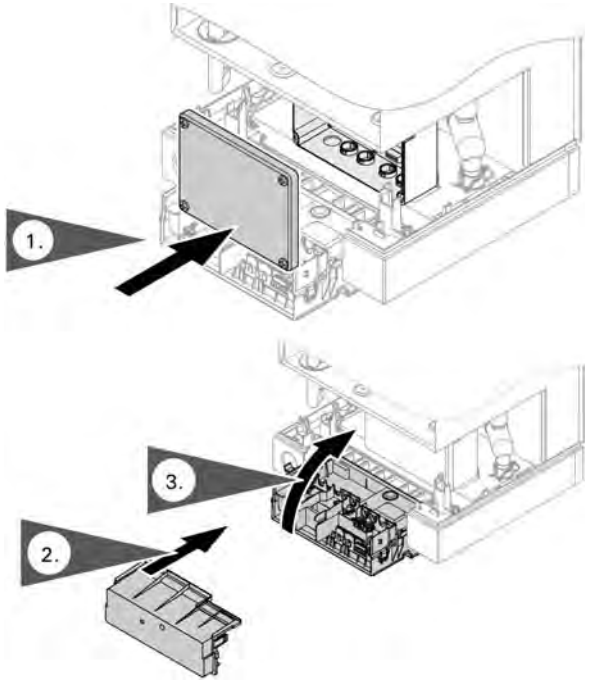
Ⓑ OpenTherm (field wiring)

Ⓒ Connection cable terminal

Ⓓ Power pump module

Follow the installation instructions of the field supplied operating controls.

## Electrical Connections *(continued)*

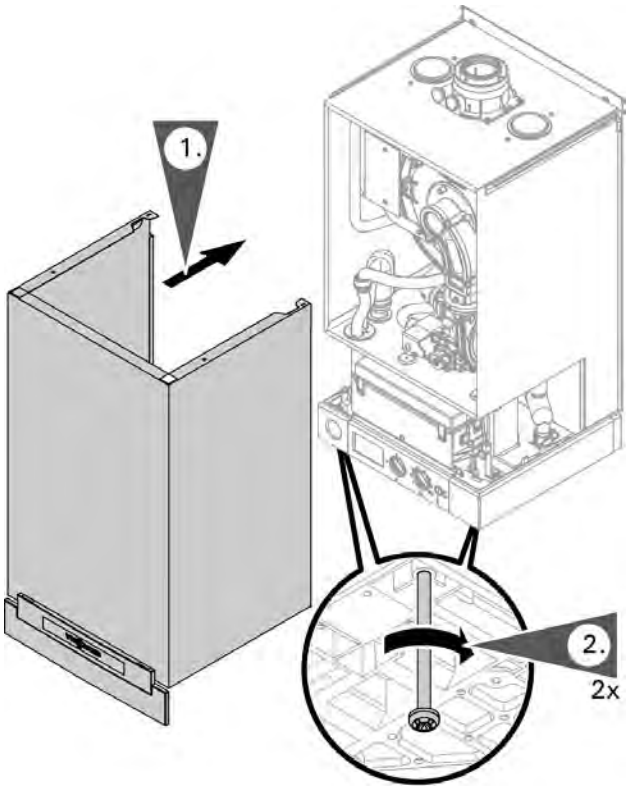



**Closing the power pump module and reinstalling the control unit**

1. Reinstall power pump module cover plate.
2. Install control cover (if previously removed).
3. Flip control upward and lock into position.

### CAUTION

**Electrical cables may become damaged if in contact with hot components.**
**When running and securing connecting cables on site, ensure that the maximum permissible temperatures of the cables are not exceeded.**




**Reinstalling the front panel**

1. Set front panel on the guide rails and push in place.
2. Tighten screws at the bottom.

### IMPORTANT

**Read and follow, where applicable, the safety instructions of all labels and stickers attached to boiler surfaces.**
**Do not remove any of these instructions.**
**Contact Viessmann if any replacement labels are required.**

## Necessary Tools

**Testing/analysis equipment** (use only calibrated equipment)

- Multimeter to measure 0 - 12A, 120V and Ω resistances
- Flue gas analyzer to measure % $CO_2$ or $O_2$ (i.e. Bacharach fluid samplers or suitable electronic flue gas analyzer)
- Manometer to measure gas pressure 0 to 11 "w.c. (accurately) and up to 28 "w.c. gas pressure (or a non-electric Magnehelic® manometer may also be utilized)
- Stack thermometer 0 to 500°F (0 to 260°C)
- Bacharach calculator or suitable tables to calculate standard (non-condensing) efficiency
- Carbon monoxide measuring equipment 0 to 400 ppm.

**Special items**

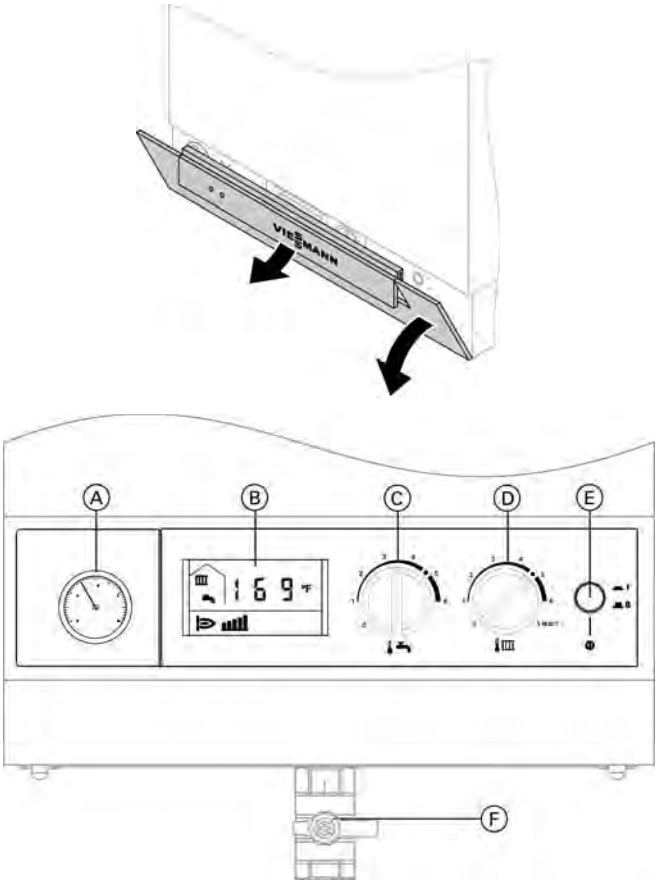
- Approved leak detection fluid for natural gas
- Pipe joint sealant
- Garden hose for bleeding boiler heat exchanger and pressure testing

**Cleaning supplies**

- Plastic hand brush
- Rags

## Overview of Controls and Indicators

Lift flap and pull control unit cover down. All boiler controls are located behind the control unit cover.

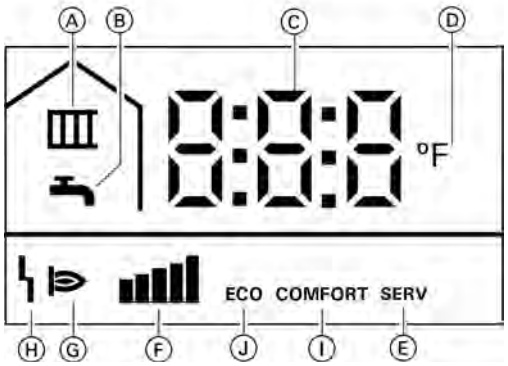



**Legend**

Ⓐ Pressure gage
Ⓑ LCD display
Ⓒ "🌡🚰" Selector dial for DHW temperature
Ⓓ "🌡🔥" Selector dial for boiler water temperature
Ⓔ ON / OFF switch
Ⓕ Gas shut-off valve

**Control and display elements**

The control unit is preset at the factory for standard operation. Your heating system is ready for use. The factory presets may be individually adjusted to suit your specific requirements.




**Legend**

Ⓐ Heating mode pump output "ON" (when RT is closed)
Ⓑ DHW mode pump output "ON" (when DHW is closed)
Ⓒ Boiler water temperature in °F or fault code
Ⓓ Units for boiler water temperature measurement
Ⓔ Service mode
Ⓕ Current burner firing power rate
Ⓖ Burner in operation indicator
Ⓗ Fault indicator
Ⓘ Comfort function started
Ⓙ Comfort function stopped

## Overview of Boiler Components

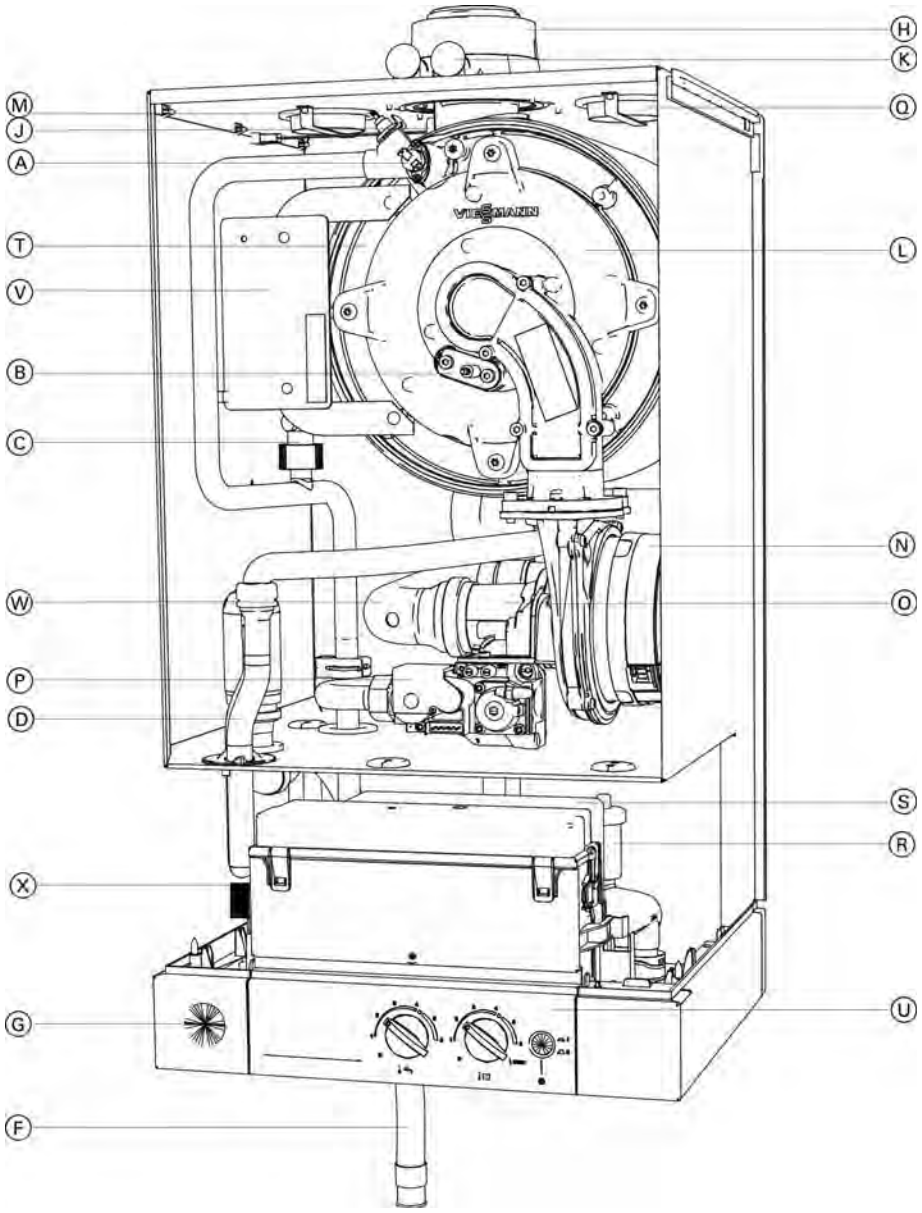



*Fig. 45*

**Legend**

Ⓐ Fixed high limit, 210°F (99°C)
Ⓑ Ignition / ionization electrode
Ⓒ Flow switch, VK315M
Ⓓ P-trap
Ⓕ Condensate hose, 16" (400 mm)
Ⓖ Water pressure gage
Ⓗ Vent pipe adaptor
Ⓙ Flue gas temperature sensor 230°F (110°C)
Ⓚ Test port caps (x2)
Ⓛ Burner mounting flange assembly
Ⓝ Radial fan
Ⓞ Air / gas inlet Venturi
Ⓛ Burner mounting flange assembly
Ⓜ Boiler temperature sensor
Ⓝ Radial fan
Ⓞ Air / gas inlet Venturi
Ⓣ Heat exchanger / flue gas collector
Ⓤ Control console flame safeguard (with ignition transformer unit)
Ⓥ ASME / NB plate
Ⓦ Inlet air Venturi extension
Ⓧ Terminal strip (low voltage wiring)



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## Overview of CombiPLUS Components

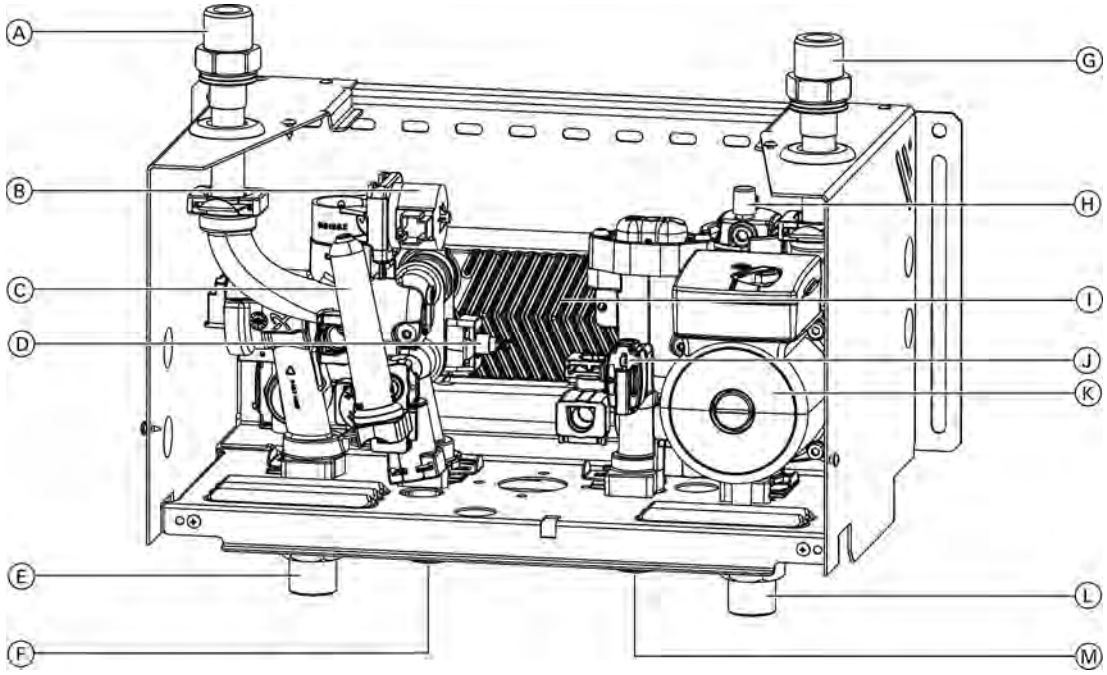
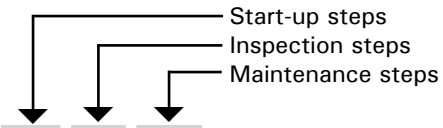



*Fig. 46*

**Legend**

Ⓐ Boiler water supply
Ⓑ Diverting valve
Ⓒ Expansion tank
Ⓓ Outlet temperature sensor
Ⓔ System water supply
Ⓕ DHW
Ⓖ Boiler water return
Ⓗ Air vent valve
Ⓘ Plate-type heat exchanger
Ⓙ Flow sensor
Ⓚ Circulation pump
Ⓛ System water return
Ⓜ DCW

## Procedure Overview





| | | | | |
|---|---|---|---|---|
| S | I | M | 1. | **Fill and vent the heating system** ..... 57 |
| S | | | 2. | **Check power supply connection**. ..... 58 |
| S | | | 3. | **Select appropriate gas type** ..... 58 |
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| S | I | M | 5. | **How the Vitodens 100-W boiler operates** ..... 61 |
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| | I | M | 10. | **Check all primary and secondary circuit connections for leaks** ..... 66 |
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| | I | | 21. | **Check functioning of safety valves** ..... 71 |
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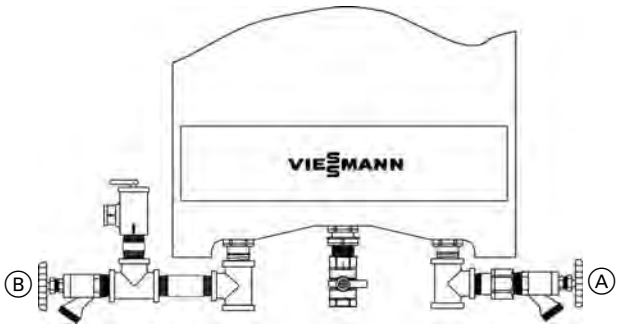
# Steps

**Start-up** | **1. Filling and bleeding heating system**

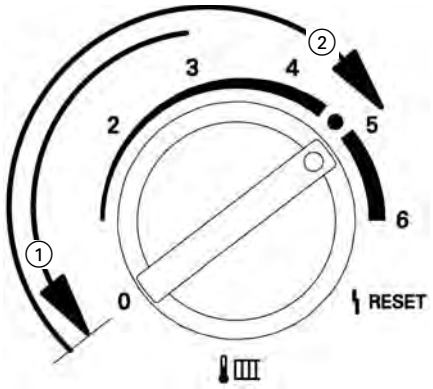



## CAUTION

**Unsuitable fill water increases the level of deposits and corrosion, and may lead to damage to the equipment.**

- **Thoroughly flush the entire heating system prior to filling with water.**
- **Only use fill water of potable quality.**
- **Soften fill water harder than 150 ppm temporary hardness.**
- **Inhibitors or antifreeze additives suitable for heating systems may be added manually.**

During fill and removal of air, the boiler pump can be activated. To activate the pump, in less than 2 seconds turn selector dial to stand-by position ① from a control range (counter-clockwise) and then right back into the control range ② (clockwise). The pump will run for 30 minutes and cancel the request automatically or after the ON/OFF switch is turned OFF.




**1.** Open system isolation valves (if installed).

**Note:** Before filling the heating system with water, check that all necessary flow check valves are installed.

**2.** Check inlet pressure of the diaphragm expansion tank.

**Note:** If the nitrogen pressure of the precharged expansion tank is less than the static pressure of the system, inflate membrane pressure to slightly exceed pressure of system. The static pressure required at the tank is based upon the static height of the system. The system fill pressure value must be equal to the expansion tank pressure value at approx. 60°F (15.6°C).

**3.** To remove debris and/or sludge ensure that the system piping is flushed out. Failure to do so may cause sediment in the boiler causing overheating and damage not covered by warranty.

**Note:** System fill pressure must be approximately 3 psig higher than the static head when the system is cold.

**4.** *Optional:*
Fill the heating system with water at the boiler filling tap Ⓐ and drain air completely from the drain tap Ⓑ.

**Note:** Water treatment should be considered in areas where it is known that boiler feed water contains a high mineral content and hardness. In areas where freezing might occur, an antifreeze may be added to the system water to protect the system. Please adhere to the specifications given by the antifreeze manufacturer. Do not use automotive silicate-based antifreeze. Please observe that an antifreeze/water mixture may require a backflow preventer within the automatic water feed and influence components such as diaphragm expansion tanks, radiation, etc. A 30% antifreeze content will provide freeze-up protection to -10°F (-23°C). Do not use antifreeze other than specifically made for hot water heating systems. System also may contain components which might be negatively affected by antifreeze. Check total system frequently when filled with antifreeze.

*To remove air from the heat exchanger:*

- Connect a hose to the boiler filling tap Ⓐ and connect the other end to fresh water supply (or heating medium).
- Open the fresh water supply valve and then open the boiler filling tap Ⓐ slowly to fill the boiler with water. Isolation valves (not shown) to isolate system components must be closed during fill/bleed process.
- Flush the boiler heat exchanger via the boiler supply and return (for at least 10 mins.) until all air has been removed from the boiler.
- When the drain tap Ⓑ begins to bleed water, close the boiler drain valve and open system isolation valves.

## Steps *(continued)*

**Start-up**

### 1. Fill and vent heating system *(continued)*

5. Check system pressure.

6. Ensure proper / adequate fuel supply exists.
   Open gas shutoff valve.

   Max. boiler operating pressure.....45 psig

   Min. boiler operating pressure.....14 to 23 psig

   Pressure relief valve.....30 psig

**Start-up**

### 2. Check power supply connection

A power module is supplied with the Vitodens 100-W boiler, which requires a 120VAC power supply.

The voltage at connector X3 must be 120V (see wiring diagram).

**Neutral conductor**
The electrical power supply must have a neutral conductor.

**IMPORTANT**

**In Canada all electrical wiring is to be done in accordance with the latest edition of CSA C22.1 Part 1 and/or local codes. In the U.S. use the National Electrical Code ANSI/ NFPA 70. The heating contractor must also comply with both the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI, ASME CSD-1.**

**Note:** The outer conductor "L" and the neutral conductor "N" must not be interchanged. See wiring diagram on page 91 entitled "Additional Information" in this manual.

**Start-up and Maintenance**

### 3. Select appropriate gas type

The Vitodens 100-W boiler is for use with gases whose characteristics fall within the following ranges. Do not use any other types of gas.

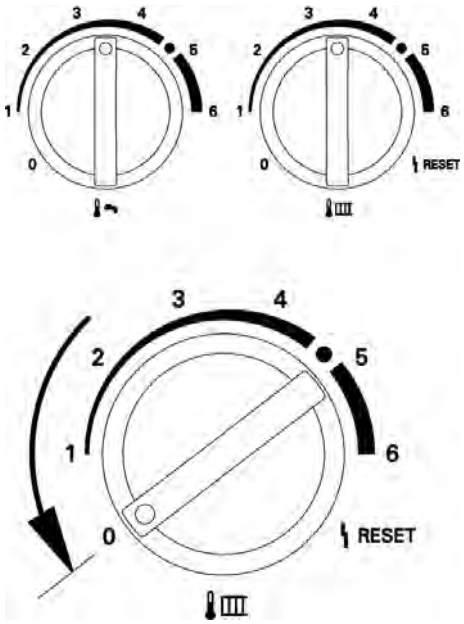
| | | Natural gas | Liquid Propane gas |
|---|---|---|---|
| Heating value (gross) | Btu/ft$^3$ | 970 to 1100 | 2466 to 2542 |
| Specific gravity | | 0.57 to 0.70 | 1.522 to 1.574 |
| Ultimate carbon dioxide (CO2) | % | 11.7 to 12.2 | 13.73 to 13.82 |

1. Verify that the fuel type listed on the boiler rating plate is the correct type for the installation being attempted.
2. Once verified, record the fuel type in Maintenance Record on page 98.

## Steps *(continued)*

**Start-up and Maintenance**

### 3. Select appropriate gas type *(continued)*

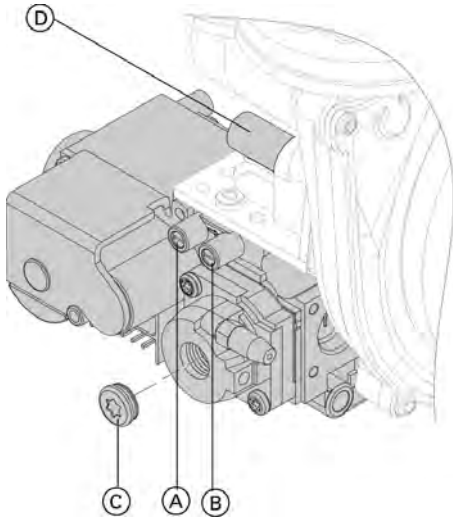



**To verify the fuel type**

1. Simultaneously turn selector dial " " and " " to their center position as shown. "SERV" appears in the display. (To do the following step, "SERV" must still be shown in the display).
2. Turn selector dial " " counter clockwise to the "O" position within 2 seconds as shown. " " and the setpoint value will flash on the display.
3. Adjust the control unit to natural gas or LPG by turning the selector dial " " counter clockwise or clockwise. The display shows:
   "0" for operation with natural gas
   or
   "1" for operation with LPG.
4. Do not adjust the selector dials for 15 seconds. The set operating mode is then saved and the control unit returns to standard mode.

**Start-up and Maintenance**

### 4. Measure static pressure and running pressure




**Legend**

Ⓐ Inlet gas pressure measurement port
Ⓑ Outlet pressure port
Ⓒ Low-fire adjustment screw / cover
Ⓓ Hi-fire adjustment screw

**Static pressure**

1. To measure static and/or running pressure remove burner cover panel as per the removal instructions on page 67.
2. Close gas shutoff valve.
3. Loosen screw in test nipple Ⓐ on the gas combination valve, **do not remove completely**. Connect calibrated manometer.
4. Open the gas shutoff valve.
5. Measure static pressure. Values must be:
   - 14 "w.c. max. for NG
   - 14 "w.c. max. for LPG
6. Enter measured value into Maintenance Record on page 98 in this manual.
7. Start up boiler, using the on/off service switch (field supplied).

## IMPORTANT

**A $CO_2$ measurement (see page 62) must be taken before and after working on gas appliances to eliminate health risks and to guarantee the satisfactory condition of the system.**

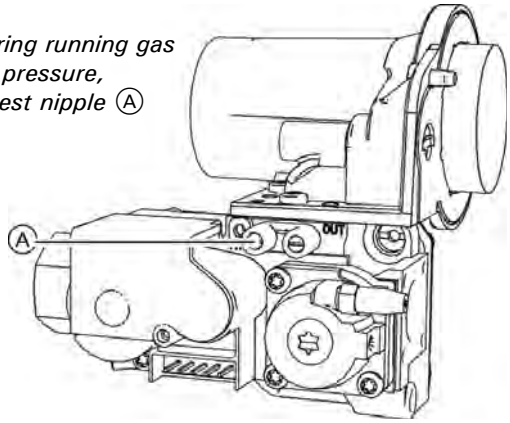
## IMPORTANT

**The burner is automatically ignited and starts operation after a safety time has elapsed. During initial start-up, the unit may indicate a fault F4 because of air in the gas supply pipe. After fault F4 is displayed, reset the burner (see page 76). The ignition procedure is repeated. This boiler employs a direct spark ignition system with 3 trials for ignition.**

## Steps *(continued)*

**Start-up and Maintenance**

**4. Measure static pressure and running pressure** *(continued)*




*Measuring running gas supply pressure, using test nipple Ⓐ*

**8.** All measurements must be made under high-fire conditions.

**Note:** Use suitable measuring instruments calibrated with a minimum resolution of 0.04 "w.c. for measuring the running pressure.

Measure the running pressure; value must be:

| Running supply pressure with Natural gas | Running supply pressure with Liquid propane gas | Corrective action |
|---|---|---|
| under 4 "w.c. | under 10 "w.c. | Do not attempt adjustment. Call local gas utility to increase pressure. |
| 4 to 14 "w.c. | 10 to 14 "w.c. | Start up boiler. |
| over 14 "w.c. | over 14 "w.c. | Do not attempt adjustment. Call local gas utility to decrease pressure. Boiler valve must not be exposed to pressure over 14 "w.c. |

**9.** Enter gas type into Maintenance Record on page 98 in this manual.

**10.** Switch off the heating system ON/OFF service switch (boiler is shut down), close the gas shut-off valve, remove the manometer and re-tighten the screw in the test nipple Ⓐ.

**11.** Open gas shutoff valve and check that the test nipple Ⓐ and all gas connections are gas-tight.

**⚠ WARNING**

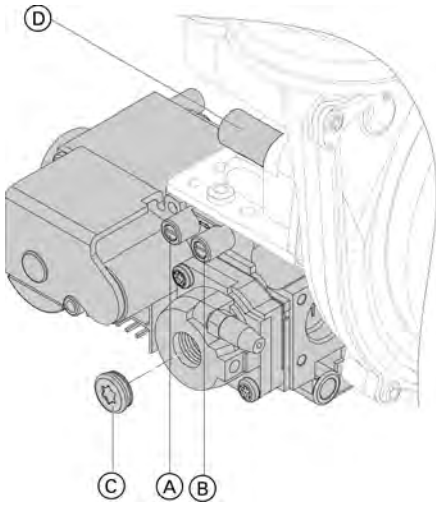
**Ensure that there is no open flame in the room.**

**⚠ WARNING**

**Never purge a gas line into a combustion chamber. Never use matches, candles, flame, or other sources of ignition for purpose of checking leakage. Use a soap-and-water solution to check for leakage. A failure to follow this warning could result in fire, explosion, personal injury, or death.**

## Steps *(continued)*

**Start-up and Maintenance** | **5. How the Vitodens 100-W boiler operates...**




**Legend**

Ⓐ Inlet gas pressure measurement port
Ⓑ Outlet pressure port
Ⓒ Low-fire adjustment screw / cover
Ⓓ Hi-fire adjustment screw

The Vitodens 100-W boiler uses a premix combustion system, which is designed to deliver a measured air-gas mixture to the burner for complete combustion.

The gas is injected upstream of the blower. The burner and heat exchanger are part of a forced-draft design.

The benefits of forced-draft systems are lower component temperatures, direct air-fuel connection (premix) for improved mixing, and longer service life of the boiler due to mild to moderate ambient conditions.

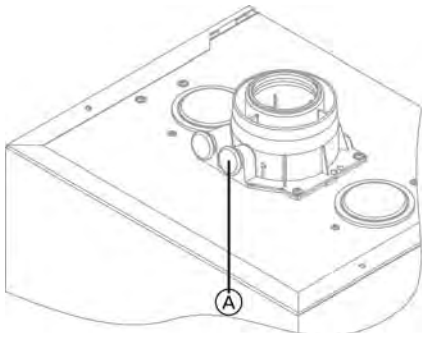
The matrix cylinder burner blower and the combination gas valve are factory calibrated and pre-adjusted for optimum boiler performance at all firing rates through a pneumatic link between combustion air and gas flows.

Blower speed is automatically increased or decreased based on heat demand, thereby regulating the amount of combustion air drawn. The pneumatic link between air and gas introduces the required amount of gas for correct combustion to meet the current heat demand, based on a linear relationship between $\Delta$ P air and $\Delta$ P gas.

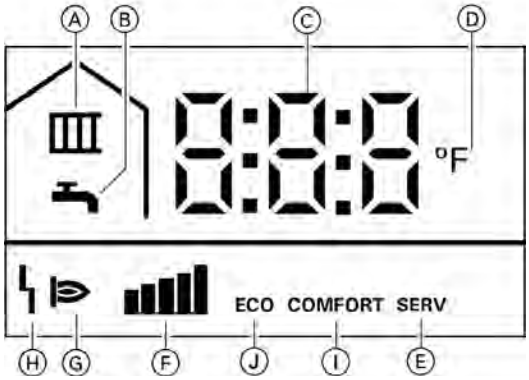
## Steps *(continued)*

**Start-up and Maintenance**

### 6. Relay tests (burner tests)




Ⓐ Flue gas measuring port




**Legend**

Ⓐ Heating mode pump output on
Ⓑ Heating mode
Ⓒ Boiler water temperature in °F or fault code
Ⓓ Water temperature unit in °F
Ⓔ Service mode
Ⓕ Current burner firing rate
Ⓖ Burner in operation
Ⓗ Fault
Ⓘ Comfort function started
Ⓙ Comfort function stopped

The Vitodens 100-W boiler is factory preset for operation with natural gas. It is recommended that a $CO_2$ check be performed at the boiler vent pipe adaptor as part of the initial start-up/maintenance procedure.
For high altitude operation above 5,000 ft (1,500 m), refer to page 64 first.

For conversion to propane, see the separate instructions. The $CO_2$ value lies within the range of;

- 7.5 to 10.5 % for natural gas and 10 to 12% for liquid propane gas. The $CO_2$ value measured must be compared with the above $CO_2$ value.

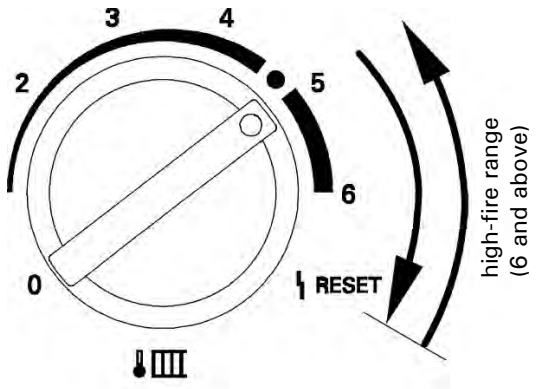
| | $CO_2$ | |
|---|---|---|
| | **high-fire** | **low-fire** |
| **NG range** | 7.5-10.5% | 7.5-10.5% |
| **Target value** | 9.0% | 8.7% |
| **LPG range** | 10.0-12.0% | 10.0-12.0% |
| **Target value** | 10.8% | 10.5% |

**Note:** When the boiler is initially turned on, a self-diagnostic check is initiated. Wait until the temperature display is stabilized and the boiler's actual temperature is displayed.

**Note:** If step 14 is not performed, the process will end automatically after 30 minutes.

If the $CO_2$ value measured lies more than 1% outside the stated range, perform the following step:
- Check the venting system for leaks (refer to the Vitodens Venting System Installation Instructions).

**1.** Bring the boiler to a high-fire test position by turning the selector dial "🌡" clockwise all the way to "↯ **Reset**" and then back again into the high-fire control range (in less than 2 seconds).
The display shows "**SERV**", the boiler water temperature, five bars "▮▮▮▮▮" for high-fire test, burner in operation "🔥" and "▥" pump operation.




Control range - high-fire



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## Steps *(continued)*

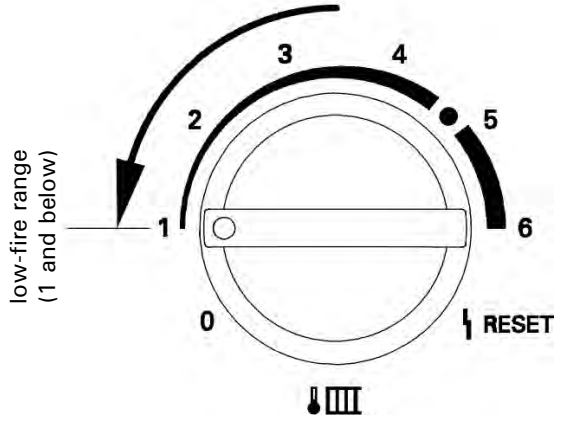
**Start-up and Maintenance**

**6. Relay tests (burner tests)** *(continued)*

**Note:** During the relay test (if required) the selector dial "🌡" position can limit the boiler input according to the following table;

| Dial setting | Input setting | Display flashing |
|---|---|---|
| 1 & below | low fire | ı |
| between 1 & 6 | between low & high fire | ıı |
| 6 & above | high fire | ıııı |

2. Check the flue gas $CO_2$ content. Should the actual value deviate by more than 1% from the range shown in the table, check the seals in the balanced flue system. Adjust if necessary.
3. Enter actual values into the service report.
4. Bring the boiler to a low-fire test position by turning the selector dial "🌡" clockwise all the way to "↯ **Reset**" and then back again into the low-fire test control range (in less than 2 seconds). If the selector dial is in the high-fire position, turn the dial to the low-fire position. The display shows "**SERV**", the boiler water temperature, one bar "ı" for low-fire test, burner in operation "🔥" and "🌡" pump operation.




Control range - low-fire

**Note:** Once in a low / high-fire test range, you can switch back and forth between the high and low by simply positioning the control range for the required test.

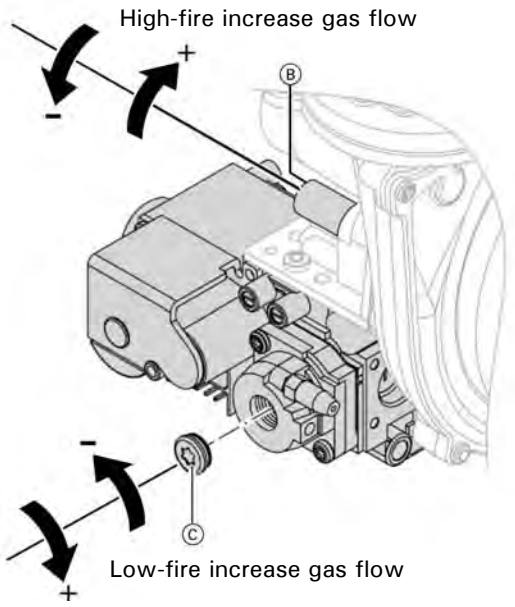
**Note:** The heat generated by the boiler during the high-low-fire relay test must be removed. The heating load must be imposed on the boiler (DHW or heating) during the duration of the test. Boiler temperature is automatically adjusted to a maximum of 178°F (81°C).

5. Check the flue gas $CO_2$ content. Should the actual value deviate by more than 1% from the above range, check the seals in the balanced flue system.
6. Enter actual values into the service report.

## IMPORTANT

**Steady state conditions must be established before measuring flue gases.**

7. Check the $CO_2$ content for high- and low-fire again. If the $CO_2$ content is **still not** within the given range (refer page 62), adjust the $CO_2$ content.
8. **Adjusting the $CO_2$ content.** See $CO_2$ table on page 62.
9. Adjust the high-fire (natural gas or liquid propane gas). With the adjusting screw Ⓑ, using a hex head wrench (4 mm), adjust the high-fire $CO_2$ content to 9% for NG or 10.8% for LPG. Clockwise rotation decreases gas flow and counter-clockwise rotation increases gas flow.

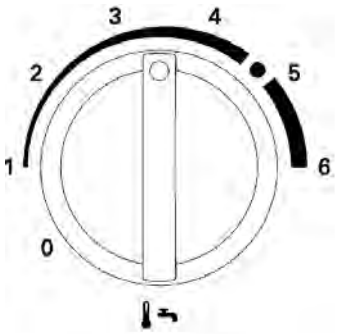


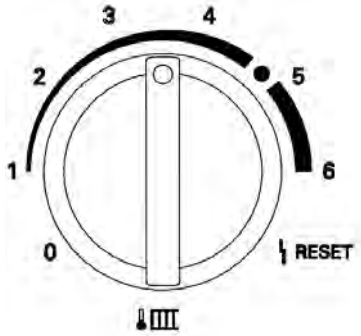

10. Adjust the low-fire (natural gas or liquid propane gas). Remove cover Ⓒ from the gas valve. With the adjusting screw under the cover and using a T40 size Torx head wrench, set the low-fire $CO_2$ content to 8.7% for NG or 10.5% for LPG. Clockwise rotation increases gas flow and counter-clockwise rotation decreases gas flow.
11. Reinstall cover Ⓒ.
12. Shut the boiler down, remove flue gas analyzer and close flue gas measurement port Ⓐ.
13. Return selector dial "🚿" and "🌡" to the original positions.
14. To cancel the relay test, switch the boiler OFF then back ON. If not cancelled, the relay test is automatically deactivated after 30 minutes.

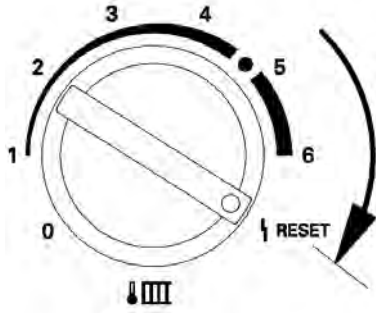
## Steps *(continued)*

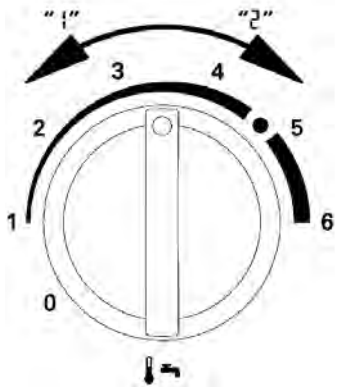
**Start-up and Maintenance**

### 7. High altitude setting




**Note:** When the boiler is initially turned on, a self-diagnostic check is initiated. Wait until the temperature display is stabilized and the boiler's actual temperature is displayed.

1. Simultaneously turn selector dials "🌡🚰" and "🌡▥" to their center position. "**SERV**" appears in the display. (To do the following step, "**SERV**" must still be shown in the display.)

   **Note:** If one (or both) of the rotary selector dials are already in the central position, take it (or them) out of the central position and then simultaneously turn both rotary selectors back to the central position.

2. Turn selector dial "🌡▥" clockwise all the way to the "ϟ **Reset**" position.
3. "▥" appears on display along with flashing set value "1" or "2".
4. With selector dial "🌡🚰", set the value to "2" for operation above 5,000 ft. (1,500 m). Turn the selector dial "🌡🚰" from the center position to the right or left.

| Value | Operation |
|---|---|
| 1 | Altitude < 5,000 ft. (1,500 m) |
| 2 | Altitude > 5,000 ft. (1,500 m) |

5. Do not adjust the selector dials for at least 15 seconds. The set value "1" or "2" is then saved and the control unit returns to standard mode.
6. Turn ON/ /OFF switch OFF and then ON. When completed, it will activate the designated setting



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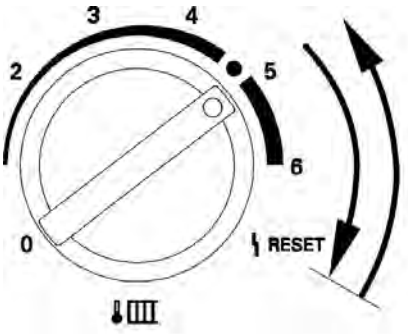
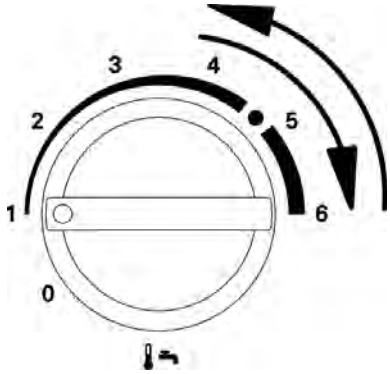
## Steps *(continued)*

**Start-up and Maintenance**

### 8. Set maximum heating input

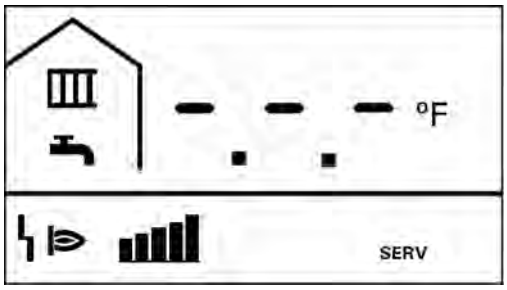



Control range




- The maximum input (or output) for heating operation can be limited (does not affect DHW heating).
  The limit is set via the modulation range.
  The maximum adjustable heating input (or output) may be limited by programming.

1. Start up the boiler.
2. Bring the boiler to a high-fire test position by turning the selector dial "🌡" clockwise all the way to "↯ **Reset**" and then back again into the middle position range (in less than 2 seconds) and back to "6".
   The display shows "**SERV**", the boiler water temperature, five flashing bars "▮▮▮▮▮" for high-fire, burner in operation "🔥" and "▥" heating system pump operation.
3. With selector dial. select the max. input (or output) for heating operation by selecting number from 1 to 6 on selector dial "🌡▥" for required value in % of the rated input (or output).
   **Note:** For example, if the selector dial is set at "1" only one bar will be flashing on the display and the input will be reduced to 40% of max input.
4. Turn the water temperature selector dial "🌡🚰" clockwise (in less than 2 seconds and back again into operation range. The icon ---.---.--- will appear for a moment on display, the control accepted the setting.
5. Press the ON/OFF switch.
6. Start the boiler and the maximum input will be set.




**Note:** When the boiler is initially turned on, a self-diagnostic check is initiated. Wait until the temperature display is stabilized and the boiler's actual temperature is displayed.

## Steps *(continued)*

**Start-up and Maintenance**

### 9. Clock natural gas meter

## IMPORTANT

**A boiler under fired by 5% is still acceptable.**
**Do not over fire the boiler.**

## CAUTION

**Always contact your gas utility to obtain the correct heating value before clocking the meter.**

Clock natural gas meter to verify input

1. Ensure all other gas equipment served by the meter is turned off during timing of gas input to the Vitodens 100-W boiler.
2. Measure the time in seconds it takes for the boiler to use 10 cu. ft. of gas. Divide 3600 x 10 by the number of seconds and you get the number of cu. ft. of gas used per hour. Multiply this number by the heating value of the gas to obtain Btu per hour input.

*For example:*
A Vitodens 100-W boiler (118 000 Btu/h input) requires 305 seconds to use 10 cu. ft. of natural gas. After contacting the local utility, you find the heating value is e.g.
1000 Btu per cu. ft.
Therefore,

((3600 x 10)/305) x 1000 ≅ 118 000 Btu/h input.
Therefore, the boiler input is correct.

*Burner input formulas (up to 4500 ft.):*
INPUT = (3600 ÷ t) x 1000 where
t = TIME (sec.) for 1 $ft.^3$
INPUT = (3600 x .01 x 1000 x 35.31)÷ T where
T = TIME (sec.) for .01 $m^3$ natural gas

**Start-up and Maintenance**

### 10. Check all primary and secondary circuit connections for leaks

Check heating system and domestic hot water connections (if applicable). Ensure all connections are pressure tight.
Correct any leaks found on fittings, pumps, valves, etc.

**Start-up and Maintenance**

### 11. Perform combustion analysis

## IMPORTANT

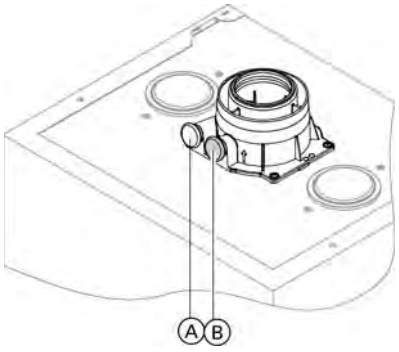
**A $CO_2$ measurement (see page 62) must be taken before and after working on gas appliances to eliminate health risks and to guarantee the satisfactory condition of the system.**

Record the measured combustion values in the sequence stated in the Maintenance Record on page 98 in this manual.

## Steps *(continued)*

**Start-up and Maintenance**

### 12. Check venting system for leaks (circular air gap measurement) For sealed combustion, coaxial vent only




**Legend**

Ⓐ Flue gas measurement port

Ⓑ Combustion air measurement port

Viessmann strongly recommends that the heating contractor perform a simplified leak test during boiler start-up. For this purpose it is sufficient to measure the $CO_2$ concentration of the combustion air in the coaxial gap of the air intake pipe. The vent pipe is considered sufficiently leak-proof if a $CO_2$ concentration in the combustion air no higher than 0.2% or an $O_2$ concentration no lower than 20.6% is measured.

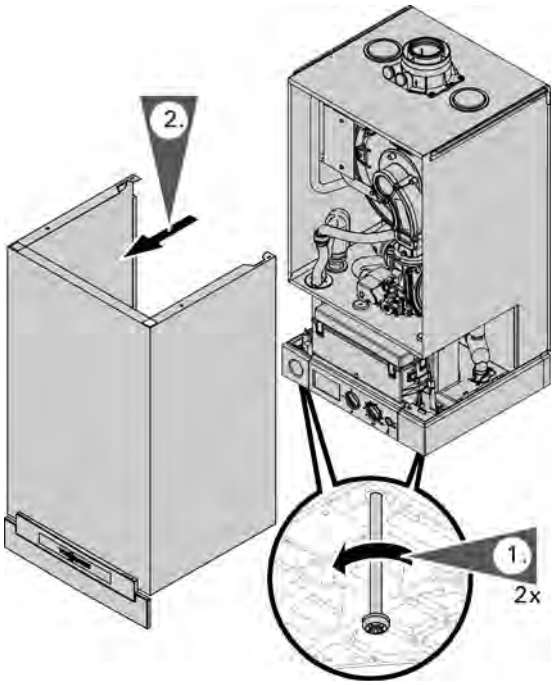
If higher $CO_2$ values or lower $O_2$ values are measured, check venting system thoroughly.

**Note:** The vent pipe adaptor comes with two measurement ports, one for combustion air intake measurement and one for flue gas measurement.

**Note:** This test is not applicable for single-wall venting systems (non-sealed combustion).

**Maintenance**

### 13. Removing front panel




To ensure continued efficient operation of the boiler, it is recommended that it is checked and serviced as necessary at regular intervals. The frequency of servicing will depend on the particular installation conditions and usage but in general once a year should be adequate. Any service work must be carried out by a licensed professional heating contractor.

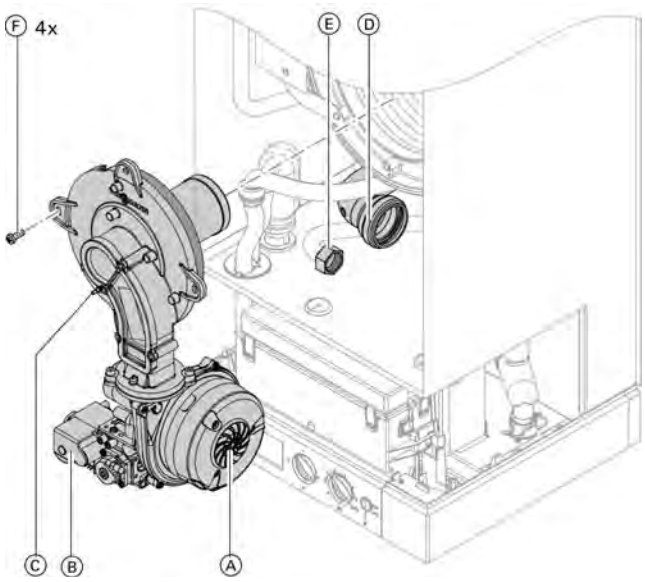
The boiler incorporates a flue gas measurement port. The flue gases can be analyzed (if required). The push fit cap may be removed and a sample tube installed. The push fit cap must be refitted after use. The flue gas sample will enable the heating contractor to judge whether any adjustments are required. Before commencing any service operation, isolate and secure the main power supply against accidental reactivation, and turn off the main gas supply.

1. Loosen the screws at the bottom of the boiler; do not remove completely.
2. Remove the front panel.

## Steps *(continued)*

**Maintenance**

### 14. Remove burner




1. Switch the burner OFF (shut off main service switch).
2. Shut off the gas supply.
3. Pull power cables from fan motor Ⓐ, gas valve Ⓑ and electrode block Ⓒ.
4. Pull the Venturi extension Ⓓ from the fan.

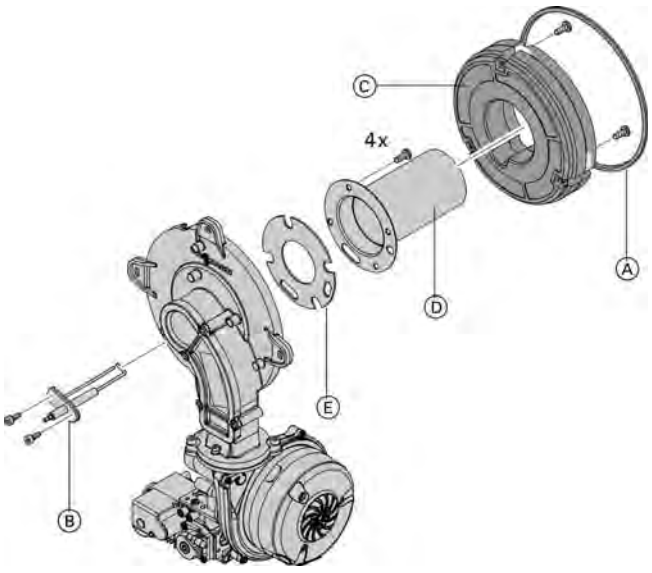
**CAUTION**

**To avoid damage to the burner, do not lay burner on its cylindrical burner tube.**
**Failure to heed this caution may cause damage to the burner tube, which may lead to improper operation.**

5. Release gas supply pipe fitting Ⓔ.
   **Note:** There is a gasket between the gas valve and this connection.
6. Loosen four Torx (T-30) screws Ⓕ and remove burner.

**Maintenance**

### 15. Check burner gasket and cylinder assembly for damage



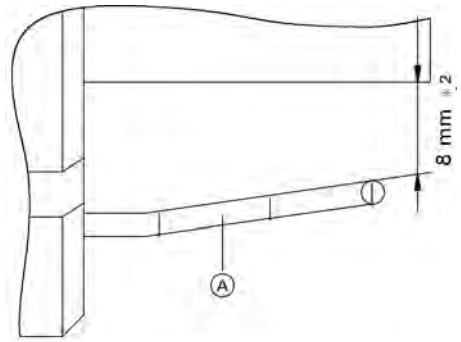

Check the burner gasket Ⓐ and burner cylinder assembly Ⓓ for damage and replace if necessary. Replace the cylinder burner assembly if damaged.

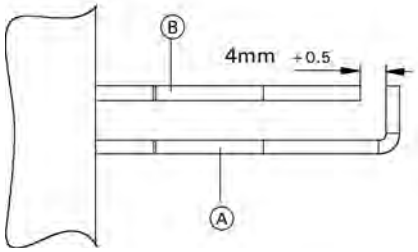
1. Remove electrode block Ⓑ.
2. Loosen the three Torx screws and remove the thermal insulation ring Ⓒ.
3. Loosen the four Torx screws and remove burner cylinder assembly Ⓓ and assembly gasket Ⓔ.
4. Fit and secure new burner cylinder assembly Ⓓ and new assembly gasket Ⓔ. Tighten to a torque of 3.5 Nm (31 lb.in.) using a calibrated torque wrench.
5. Reinstall thermal insulation ring Ⓒ.
6. Reinstall electrode block Ⓑ. Tighten to a torque of 3.5 Nm (31 lb.in.) using a calibrated torque wrench.

## Steps *(continued)*

**Maintenance**

### 16. Check and adjust ignition and ionization electrodes



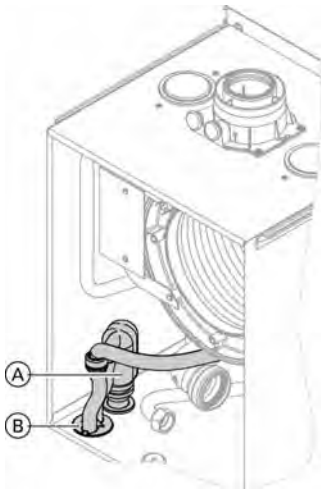

1. Check ignition and ionization electrode for wear, contamination or warping.
2. Clean electrodes with a small brush or emery paper.
3. Check clearances. If clearances are not satisfactory or the electrodes are damaged, replace electrode block and gasket and align. Tighten fastening screws for the electrodes to a torque of 3.5 Nm (31 lb.in.) using a calibrated torque wrench.
4. Reinstall grounding wire.

**Legend**

Ⓐ Ignition ionization electrode
Ⓑ Ground

**Maintenance**

### 17. Check condensate drain and clean siphon (P-trap)




1. Check the siphon to ensure unimpeded drainage of condensate.
2. Remove all hoses from siphon Ⓐ.
3. Release locking tabs at opening Ⓑ from underneath and remove siphon Ⓐ upwards.
4. Clean siphon Ⓐ and reinstall.
5. Refit all hoses. Secure drain hose with cable ties.
6. Fill the siphon Ⓐ with water by pouring 10 fl. oz. (0.3L) of water into the combustion chamber.

## IMPORTANT

**If the condensate does not drain freely, condensate will accumulate in bottom part of boiler resulting in a burner shut-down (fault message F4). The combustion chamber refractory will also become wet at the bottom. Do not restart the boiler immediately with a wet combustion chamber refractory. This will damage the refractory. Either dry the refractory (ie. using a hairdryer) or replace it.**

*Installation Instructions Neutralization Unit (if applicable)*

## Steps *(continued)*

**Maintenance**

### 18. Check neutralization unit (if applicable) — Accessory

1. Check the pH value of the condensate with a pH measuring strip. If the pH value is less than 6.5, replace granulate.
2. If contaminated: Rinse neutralization unit with tap water.
3. Add granulate as marked on the cartridge.

**IMPORTANT**

**pH measuring strip is field supplied.**

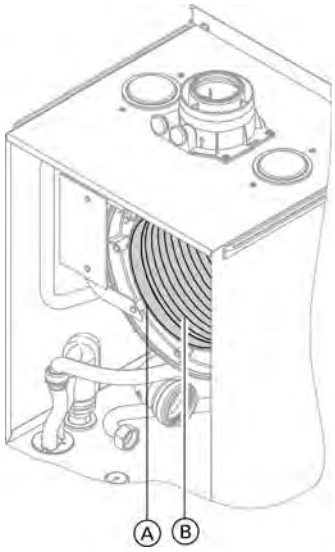
**IMPORTANT**

**The granulate is consumed as it neutralizes the condensate. The red marking indicates the min. filling level.**

*Installation Instructions Neutralization Unit*

**Maintenance**

### 19. Clean combustion chamber/heat exchanger surfaces




1. Remove burner cover panel as per the removal instructions on page 67 in this manual, and reinstall panel upon completion of service work.
2. If necessary, clean the combustion chamber Ⓐ and heat exchanger surfaces Ⓑ with a brush and/or rinse with water. Use solvent-free cleaning agents to remove residues:
   - Remove combustion by-product deposits with alkaline agents containing tenside.
   - Remove coatings and (yellowish brown) surface discoloration with phosphoric acid-based "Antox 75 E Plus", or citric acid-based CitriSurft 3050 by Stellar Solutions Inc.
   - Rinse thoroughly with water.

   **Note:** Be careful not to scratch parts which are in contact with flue gas. Use plastic brushes, not wire brushes! The cleaning agents must not contain hydrocarbon-based solvents or potassium.
3. Connect electrical cables to corresponding parts.

**WARNING**

**Follow cleaning agent manufacturer's safety instructions and wear appropriate protective equipment.**

**IMPORTANT**

Perform leak test.

## Steps *(continued)*

**Start-up and Maintenance**

### 20. Check diaphragm expansion tank and system pressure

*Perform check on the system when cold.*

1. Drain boiler/system and reduce pressure until the manometer reading is "0".
2. If the nitrogen pressure of the pre-charged expansion tank is less than the static pressure of the system, inflate membrane pressure to slightly exceed pressure of system.

   The static pressure required at the tank is based upon the static height of the system. The system fill pressure value must be equal to the expansion tank pressure value at approx. 60°F (15.6°C).

   **Note:** Static head of 33 ft. (10 m) (distance between boiler and topmost heat emitter surface) corresponds to a static pressure of 1 bar (15 psig).
3. Top up with water until filling pressure is higher than the inlet pressure of the diaphragm expansion tank.

   **Note:** With the system cold, the filling pressure must be approx. 3 psig higher than the static pressure.

   Max. boiler operating pressure.....45 psig

   Min. boiler operating pressure....14 to 23 psig

   Pressure relief valve..... 30 psig
4. When starting up the system for the first time, mark this value as the minimum filling pressure on the manometer.

   **Note:** A lower manometer reading usually indicates loss of water due to leakage. All leaks must be repaired.

**Start-up and Maintenance**

### 21. Check functioning of safety valves

Ensure proper operation of low water cut-off(s) (if applicable), pressure relief valve, and pump(s).

Check pressure gage, air vent and pressure relief valve. Ensure that pressure relief valve does not leak and that it operates in accordance with information provided by the original manufacturer.

*Refer to maintenance instructions supplied with low water cut-offs, pumps, etc.*

Flush float water type low water cut-offs (if used).

Follow local regulations with respect to backflow preventers.

If oil-lubricated pumps are used, ensure proper lubrication.

If motorized zone valves are used, refer to maintenance instructions provided with zone valves.

## Steps *(continued)*

**Start-up and Maintenance**

### 22. Check gas pipes and fittings for leaks

**WARNING**

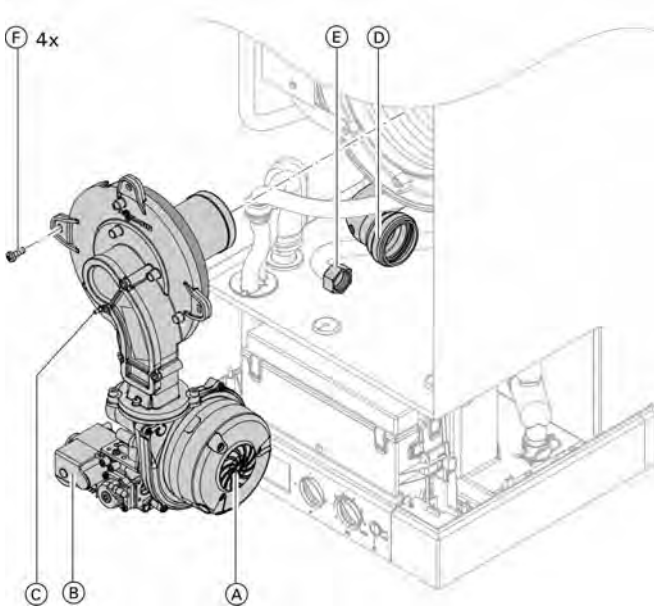
**The gas supply piping must be leak tested before placing the boiler in operation.**

**CAUTION**

**Ensure all joints of gas line are pressure tight and that gas valves do not leak when under normal operating pressure (use approved leak detection liquid). Do not use open flame.**

**Start-up and Maintenance**

### 23. Reinstall burner




1. Replace electrical cables from fan motor Ⓐ, mount burner, and diagonally tighten 4 Torx T-30 screws Ⓕ to a torque of 4 Nm (35 lb.in.).
2. Insert new supplied gasket and tighten the fitting Ⓔ on the gas connection pipe to a torque of 15 Nm (132 lb.in.).
3. Plug the Venturi extension Ⓓ into the fan.
4. Replace electrical cables from gas valve Ⓑ, and electrode block Ⓒ.
5. Open gas shutoff valve and switch on power supply.
6. Check the gas connection for tightness.
7. Install front panel, as shown on page 52.



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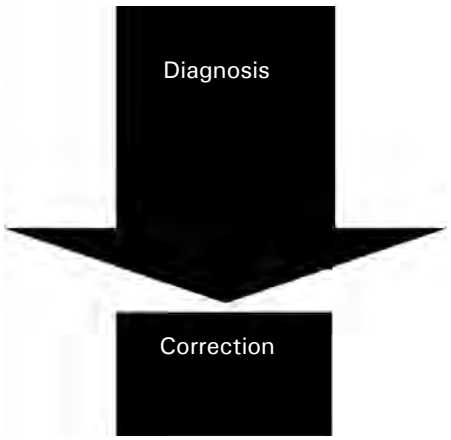
## Troubleshooting Steps




1. Establish fault message or diagnose behavior of system.
2. Look for corresponding cause of fault in the diagnostics table.
3. Find corrective measures in the table.
4. Perform corrective measures (page 74 to 76).

**Note:** See page 54 and 55 for an overview of controls, indicators and system components.

## Changing Room Temperature

In case a separate external room temperature controller (thermostat) is installed, the desired room temperature will be adjusted using this device.

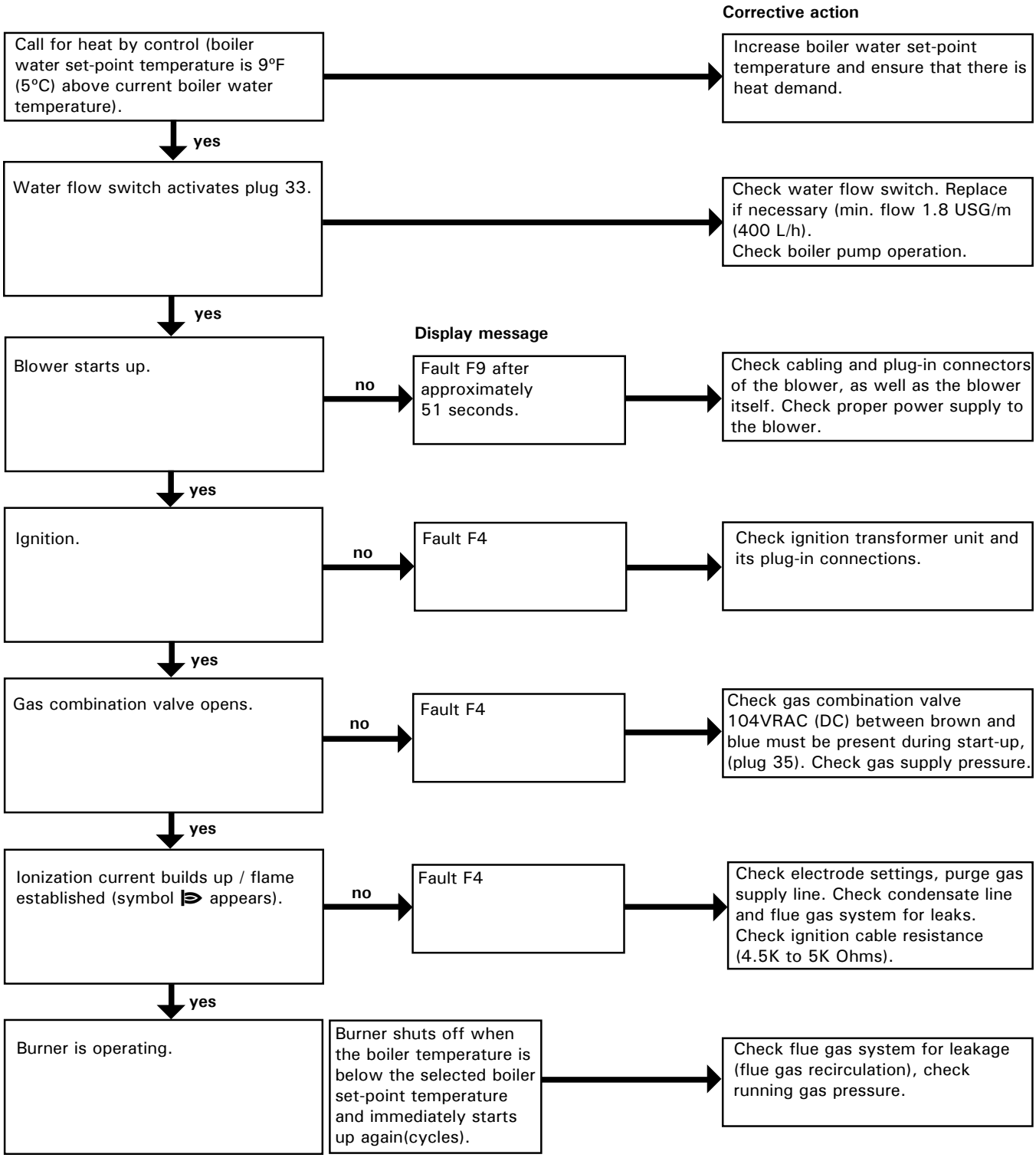
Make adjustments using the appropriate operating instructions only.

**Note:** If thermostatic radiator valves are installed in the room where the control is installed they must be fully open.

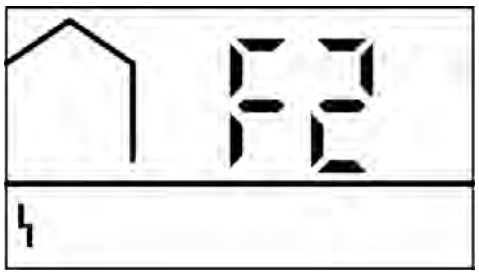
In case the room temperature setting on the separate room temperature controller is not sufficient to achieve the desired room temperature (e.g. during a particularly cold winter), the boiler water temperature can be adjusted accordingly using the boiler water temperature selector dial .

## Diagnosis

**Sequence of operation and potential faults during each start-up cycle**


Corrective action
Call for heat by control (boiler water set-point temperature is 9°F (5°C) above current boiler water temperature).
Increase boiler water set-point temperature and ensure that there is heat demand.
yes
Water flow switch activates plug 33.
Check water flow switch. Replace if necessary (min. flow 1.8 USG/m (400 L/h).
Check boiler pump operation.
yes
Display message
Blower starts up.
no
Fault F9 after approximately 51 seconds.
Check cabling and plug-in connectors of the blower, as well as the blower itself. Check proper power supply to the blower.
yes
Ignition.
no
Fault F4
Check ignition transformer unit and its plug-in connections.
yes
Gas combination valve opens.
no
Fault F4
Check gas combination valve 104VRAC (DC) between brown and blue must be present during start-up, (plug 35). Check gas supply pressure.
yes
Ionization current builds up / flame established (symbol appears).
no
Fault F4
Check electrode settings, purge gas supply line. Check condensate line and flue gas system for leaks. Check ignition cable resistance (4.5K to 5K Ohms).
yes
Burner is operating.
Burner shuts off when the boiler temperature is below the selected boiler set-point temperature and immediately starts up again(cycles).
Check flue gas system for leakage (flue gas recirculation), check running gas pressure.

## Diagnosis *(continued)*




Faults are indicated by a flashing fault code with fault code symbol "ϟ" on the display.
For fault code explanations see the following table.

**Diagnostics table: Faults with fault display on control unit**

| Fault code in display window | System characteristics *1 | Cause | Corrective measures |
|---|---|---|---|
| 10 | Constant mode | Outside temperature sensor shorted out | Check the optional outside temperature sensor and wiring (see page 78). |
| 18 | Constant mode | Outside temperature sensor wire broken | Check the outside temperature sensor and wiring (see page 78). |
| 30 | Burner blocked | Boiler water temperature sensor shorted out | Check the boiler water temperature sensor (see page 77). |
| 38 | Burner blocked | Boiler water temperature sensor wire broken | Check the boiler water temperature sensor (see page 77). |
| 50 | No DHW tank heating or external heat demand | Jumper connection shorted out, removed or missing | Install PPM jumper (see page 31) |
| 51 | No DHW heating with CombiPLUS only | Outlet temperature sensor shorted out | Check sensor (see pages 29 and 82). |
| 52 | Burner blocked (with CombiPLUS only) | Flow sensor shorted out (in CombiPLUS) | Check connections and wire; replace sensor if required. |
| 58 | No DHW heating (used with storage tanks) | Jumper connection shorted out, removed or missing | Check PPM jumper. (see page 31) |
| 59 | No DHW heating (with CombiPLUS only) | Outlet temperature sensor wire broken | Check the sensor (see page 29). |
| 5A | Burner blocked | Flow sensor wire broken | Check connections and wire; replace sensor if required. |
| A9 | Regulated operation without OpenTherm device | Communication fault OpenTherm device | Check connections and wire; replace OpenTherm device if required. |
| 60 | Burner blocked | Flue gas temperature sensor shorted out | Check sensor (see page 80). |
| 68 | Burner blocked | Flue gas temperature sensor wire broken | Check sensor (see page 80) |
| E5 | Burner blocked | Internal fault | Check the ionization electrode and connecting cable. Press reset (see page 69). |
| F0 | Burner blocked | Internal fault | Replace the control unit. |

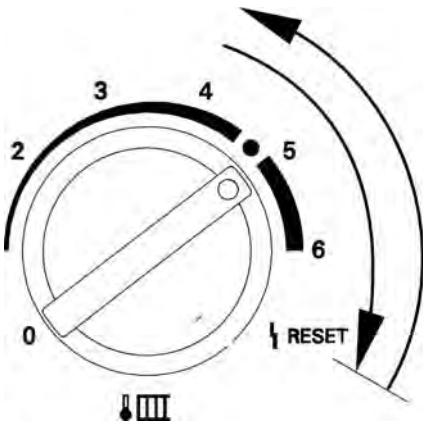
*1 *Constant mode: Boiler operates based on "🌡" temperature setting*
*Burner blocked: If fault cause is corrected, burner resumes operation.*
*Burner in fault mode: Boiler control requires manual reset before burner can resume operation.*

## Diagnosis *(continued)*

**Diagnostics table: Faults with fault display on control unit** *(continued)*

| Fault code in display window | System characteristics *1 | Cause | Corrective measures |
|---|---|---|---|
| F1 | Burner in fault mode | Maximum flue gas temperature exceeded | Check the flue gas system. Reset control. |
| F2 | Burner in fault mode | Fixed high limit tripped | Check the heating system water level. Check the circulation pump. Bleed the system. Check the fixed high limit and connecting cables. Reset control. |
| F3 | Burner in fault mode | Flame signal is already present at burner start | Check the ionization electrode and connecting cable. Reset control. |
| F4 | Burner in fault mode | No flame signal is present | Check ignition electrodes and wires. Measure the ionization current, check the gas pressure, check the gas train, ignition, ignition module and condensate drain. Reset control. Check ignition cable resistance (4.5K to 5K ohms). |
| F8 | Burner in fault mode | The combination gas valve closes too late | Check the gas train. Check both control paths. Reset control. |
| F9 | Burner in fault mode | Blower speed too low at burner start | Check the blower, check the blower cables and supply; check the blower control. Reset control. |
| FA | Burner in fault mode | Blower not at stand-still | Check the blower, blower connecting cables and blower control. Reset control. |
| FC | Burner blocked | Electrical fan control (control unit) faulty | Check fan connecting cable; if required replace cable or replace control unit. Reset control. |
| Fd | Burner blocked | Burner control unit fault | Check ignition electrodes and connecting cables. Check whether a strong interference (EMC) field exists near the equipment (correct if applicable). Reset control. Replace control unit if the fault persists. |

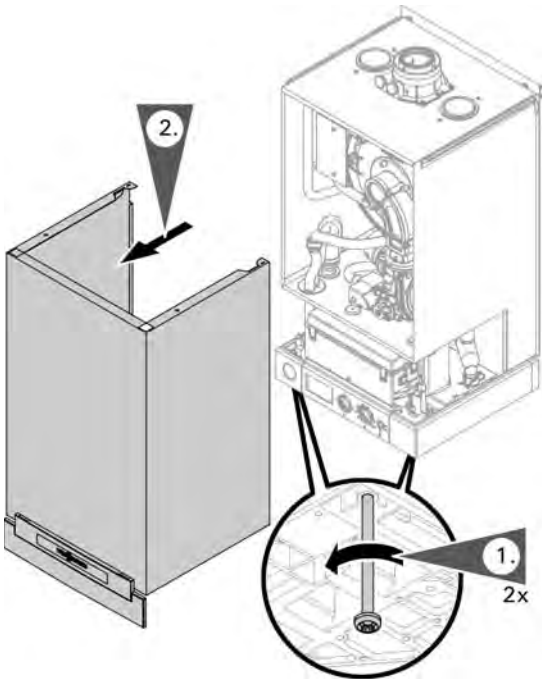
*1 *Constant mode: Boiler operates based on "🌡" temperature setting*
*Burner blocked: If fault cause is corrected, burner resumes operation.*
*Burner in fault mode: Boiler control requires manual reset before burner can resume operation.*




**How to reset faults**

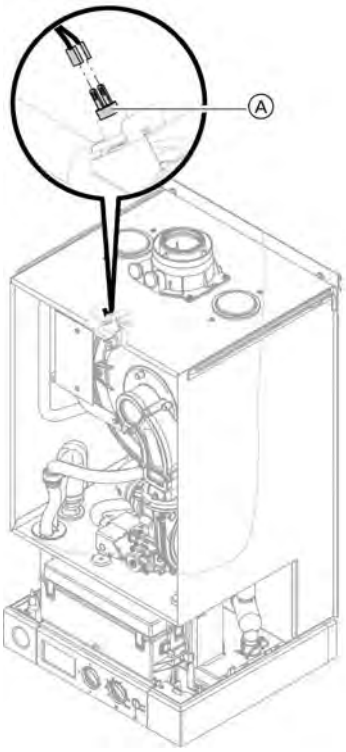
Turn rotary selector "🌡" to "↯ **Reset**", pause until "**SERV**" appears on the screen and then immediately (within 2 seconds) turn "🌡" back into the control range.
This operation will put the boiler in relay test mode if no fault is present (turn boiler off then back on to start again).

## Boiler Connection



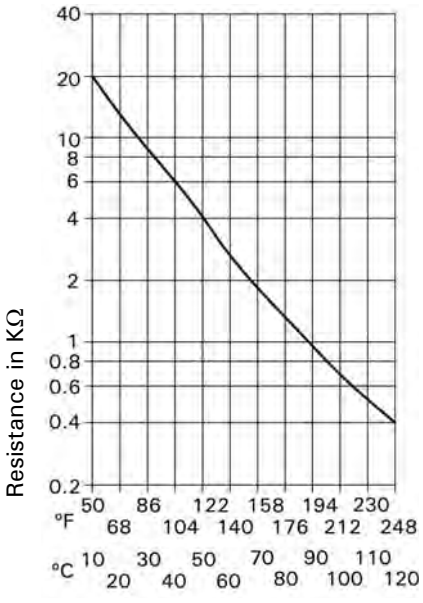

**Remove front panel**

1. Loosen the screws at the bottom of the boiler; do not remove completely.
2. Remove the front panel.




**Check boiler temperature sensor**

1. Disconnect cables from boiler temperature sensor Ⓐ.
2. Measure resistance of the boiler temperature sensor and compare with resistance/boiler water temperature curve shown.
3. If the value measured differs significantly, replace the sensor.

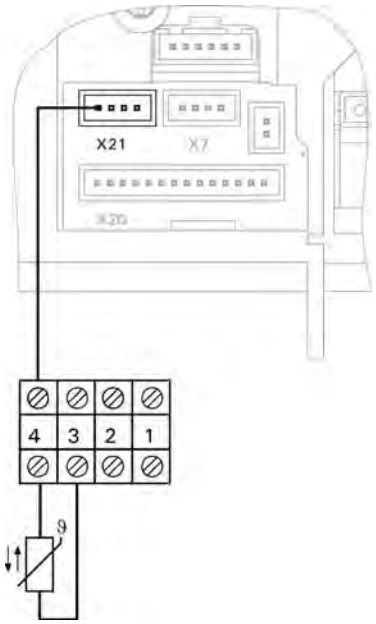



Boiler water temperature

**⚠ WARNING**

**The boiler temperature sensor is immersed in the heating water (risk of scalding).**
**Drain the boiler before replacing the sensor.**

## Boiler Connection *(continued)*




**Check outdoor temperature sensor**

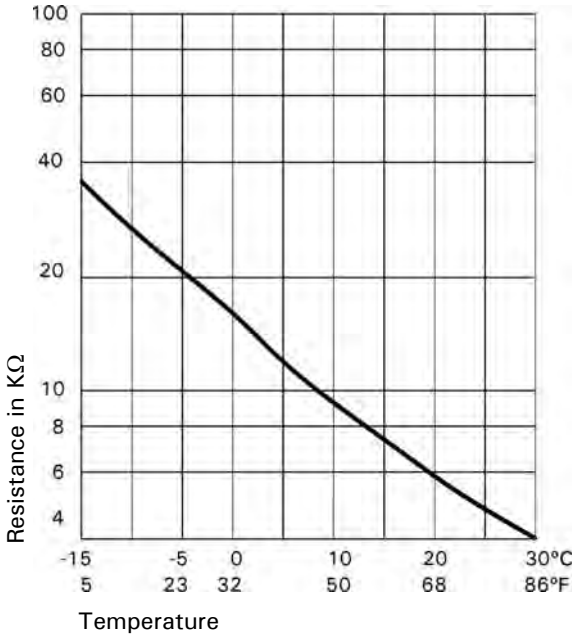
1. Disconnect cables from outdoor sensor.
2. Measure resistance of the outdoor sensor and compare with resistance / outdoor sensor curve shown below.
3. If the value measured differs significantly, replace the sensor.

In weather-compensated mode (optional), the boiler water temperature is regulated subject to the outside temperature.

**Frost protection function**

Built-in automatic frost protection allows the boiler to be shut off for an extended period of time while protecting it against freeze-up. Frost protection is continually active. The burner is switched ON when the boiler water temperature reaches 41°F (5°C) and is switched OFF again when the boiler water temperature reaches at least 59°F (15°C) [but not more than 68°F (20°C)].

*For details on the control, please refer to the Vitodens 100-W Operating Instructions.*



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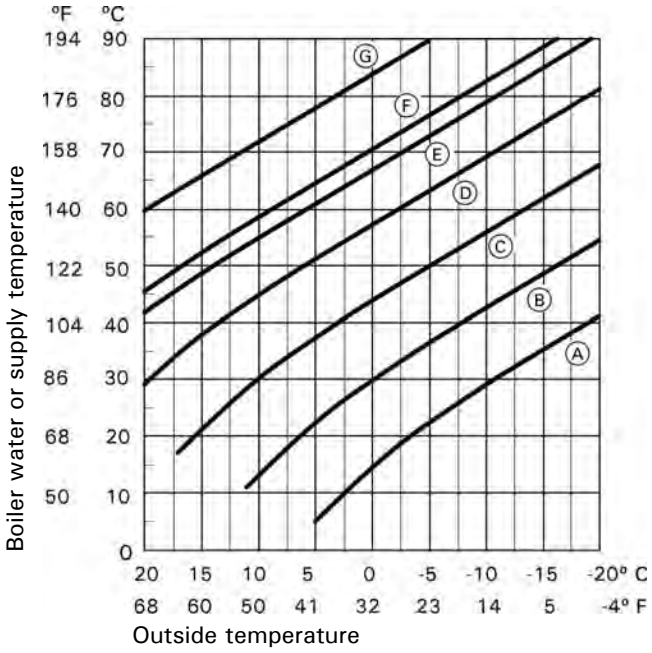
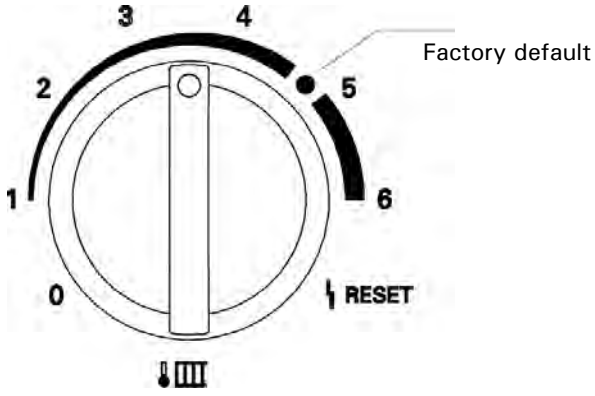
## Boiler Connection *(continued)*




**Legend**

Ⓐ Selector dial "🌡" setting: 1
Ⓑ Selector dial "🌡" setting: 2
Ⓒ Selector dial "🌡" setting: 3
Ⓓ Selector dial "🌡" setting: 4
Ⓔ Factory default
Ⓕ Selector dial "🌡" setting: 5
Ⓖ Selector dial "🌡" setting: 6




**Determining the boiler set-point**

**Room dependent control:**
**Outdoor temperature sensor not connected**

With no outdoor sensor installed, the "🌡" dial will provide a constant temperature set-point for the boiler based on the dial position selected.
Setting the dial between 1 and 6 will provide a set-point value of 81°F to 178°F (27°C to 81°C) respectively. The dot between 4 and 5 represents the factory default set-point value of 140°F (60°C).

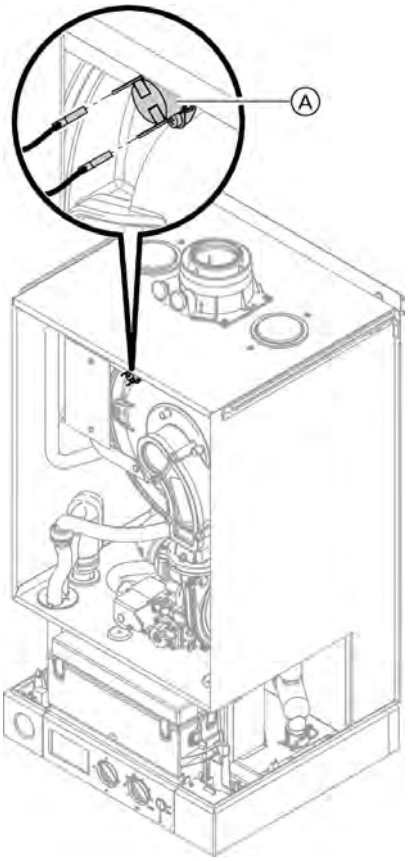
**Weather dependent control:**
**Outdoor temperature sensor connected**

With the outdoor sensor connected, the boiler will automatically recognize the sensor and switch the set-point dial operation from constant temperature calculated to outdoor reset calculated.

Adjusting the "🌡" dial will select the heating curve corresponding with the heating curve chart. The set-point will be calculated from the design boiler water temperature associated with the heating curve selected, and reset from the actual outdoor air temperature. Setting the dial between 1 and 6 will select the corresponding curve from the chart. The dot between 4 and 5 is the factory default curve.

**Note:** Both the room dependent control and the outdoor reset control strategies require a closed contact at terminals RT to generate a call for heat to the boiler. Setting the dial to "0" places the boiler in freeze protection mode regardless of the control option selected or the contact position at RT.

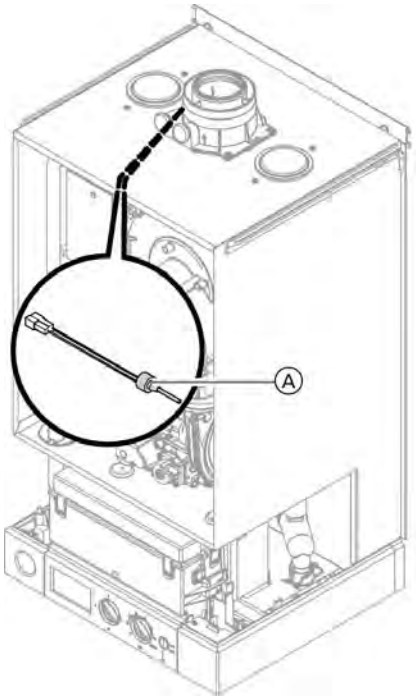
## Boiler Connection *(continued)*




**Check fixed high limit**

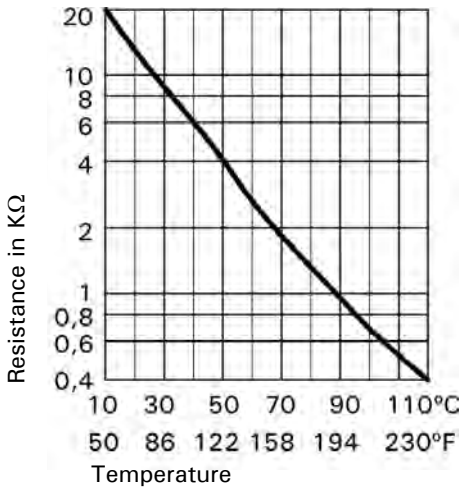
If the burner control unit cannot be reset after a fault shutdown (F2), even though the boiler water temperature is below approx. 203°F (95°C), check the fixed high limit.

1. Pull the leads from fixed high limit Ⓐ.
2. Check the continuity of the fixed high limit with a multimeter.
3. Remove faulty fixed high limit.
4. Coat the replacement fixed high limit with heat conducting paste and install.
5. To reset, refer to page 76.




**Check flue gas temperature sensor**

1. Pull the leads from flue gas temperature sensor Ⓐ.
2. Check the sensor resistance and compare it with the curve.
3. Replace the sensor in case of severe deviation.



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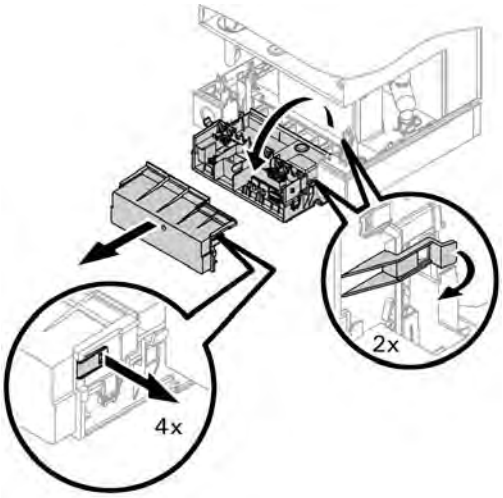
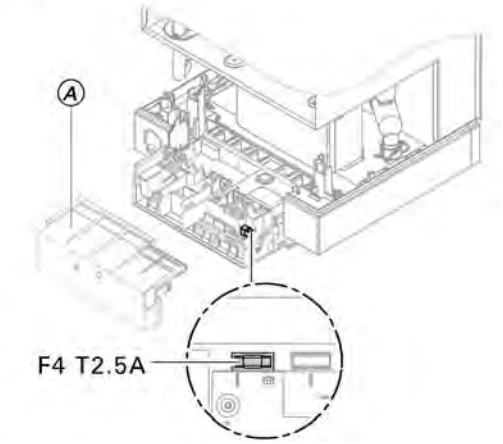
## Boiler Connection *(continued)*

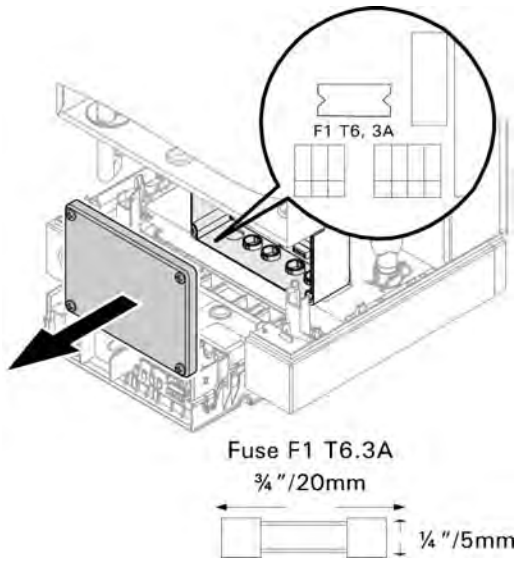



**Check fuses**

**Control unit fuse**

1. Switch off main power supply.
2. Flip down control unit.
3. Remove cover Ⓐ.
4. Check fuse F4 T 2.5A (slow blow). Replacements fuses are available from Viessmann in packs of 10 (Part No. 7404 396).



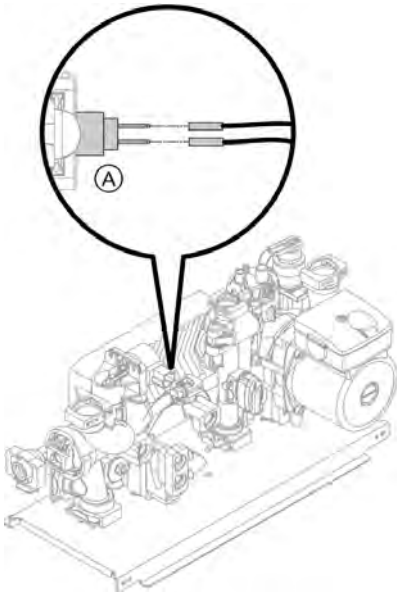

**Power pump module fuse**

1. Switch off main power supply.
2. Flip down and remove control unit Ⓐ. Also refer to pages 50 and 52.
3. Remove power pump module cover plate Ⓑ.
4. Check fuse F1 T6.3A (slow blow). Replacements fuses are available from Viessmann in packs of 10 (Part No. 7815 580).

## IMPORTANT

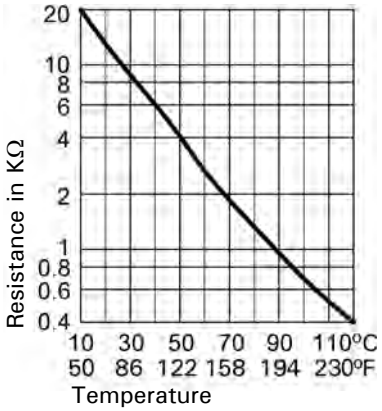
**The ON / OFF switch located on the boiler does not disconnect power to power pump module, therefore the main service switch or breaker must be turned off.**

## CombiPLUS Connection

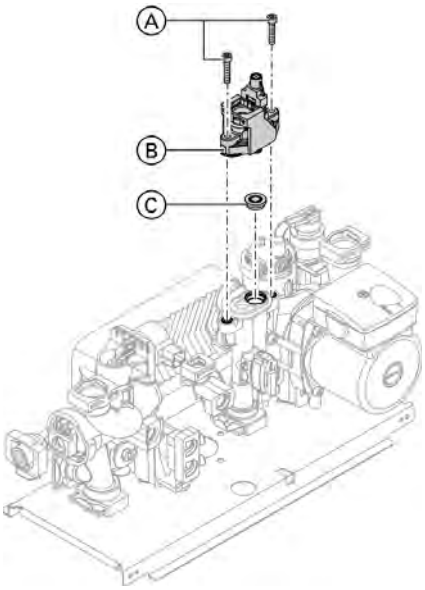



**Check outlet temperature sensor**

1. Pull the leads from outlet temperature sensor Ⓐ.
2. Check the sensor resistance and compare it with the curve.
3. Replace the sensor in case of severe deviation.




**Note:** Water can leak when replacing the outlet temperature sensor. Shut off the cold water supply. Drain the DHW line and the plate type heat exchanger (DHW side).




**Replacing the flow limiter**

1. Drain the boiler and combiPLUS.
2. Remove screws from the cover and remove cover.
3. Undo screws Ⓐ.
4. Remove the cap Ⓑ.
5. Remove faulty flow limiter Ⓒ.
6. Select new flow limiter Ⓒ corresponding to boiler size (see boiler rating plate). See page 26.
7. Insert new flow regulator Ⓒ.
8. Fit new cap Ⓑ provided.



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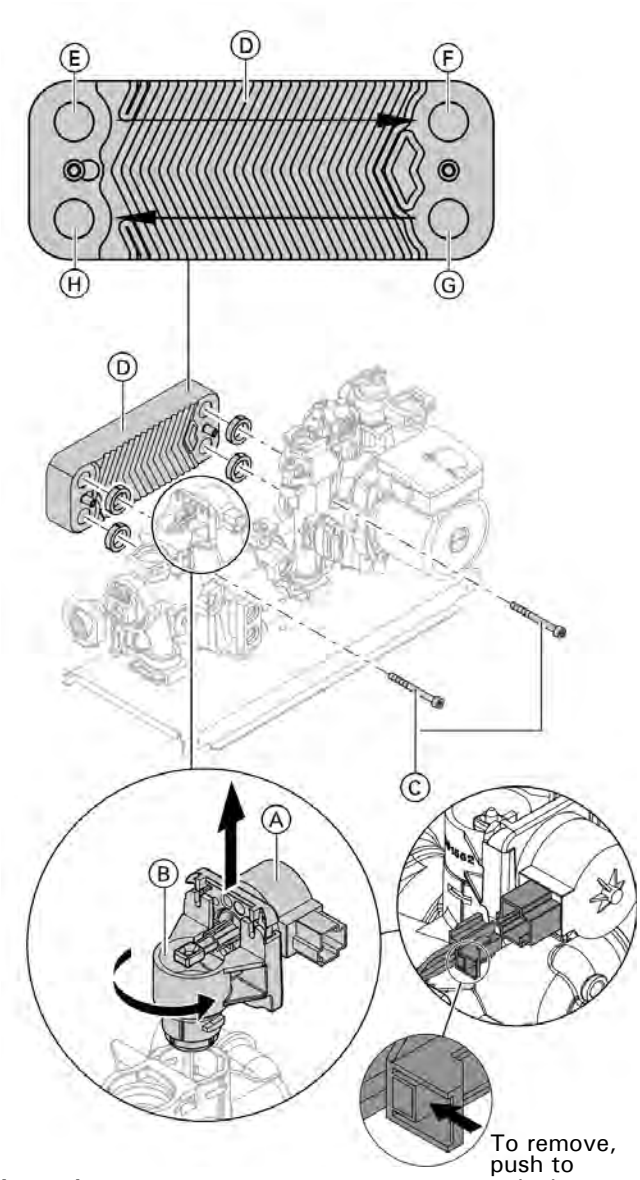
## CombiPLUS Connection *(continued)*




**Legend**

Ⓐ Three-way valve drive
Ⓑ Three-way valve
Ⓒ Screws
Ⓓ Plate-type heat exchanger
Ⓔ Heating water supply
Ⓕ Heating water return
Ⓖ DCW
Ⓗ DHW

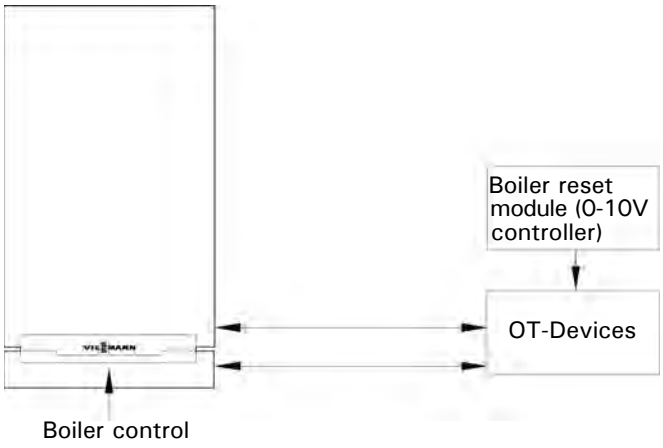
**Checking or replacing the plate type heat exchanger**

1. Shut off and drain the boiler on the heating water and the DHW side.
2. Disconnect diverting valve motor connection
3. Push the three-way drive Ⓐ slightly upwards.
4. Turn the three-way valve Ⓑ with drive Ⓐ 1/8 turn counterclockwise and remove.
5. Remove two screws Ⓒ from the plate-type heat exchanger and remove the plate-type heat exchanger Ⓓ with gaskets.

   **Note:** During removal, small amounts of water may trickle out and escape from the removed plate-type heat exchanger.
6. Check the DHW side for scaling and if required, clean or replace the plate-type heat exchanger.
7. Check the heating water side for contamination and if required, clean or replace the plate-type heat exchanger.
8. Install in reverse order with new gaskets.

   **Note:** Refer to the installation Instructions for additional mounting options.

# Electrical Connections to the Terminal Strip for Accessories

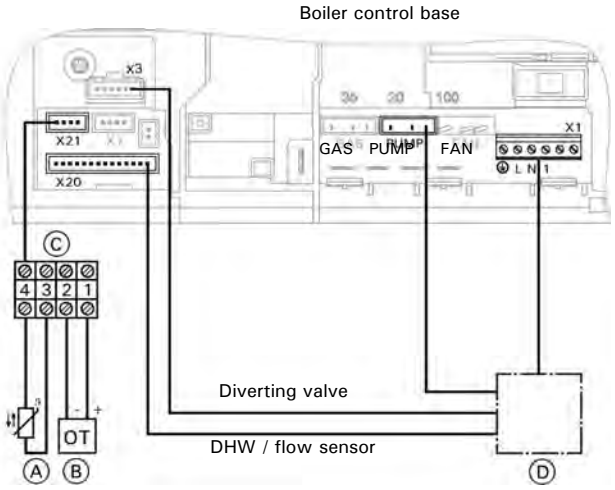



Follow the installation instructions of field supplied operating controls.

**What is OpenTherm?**

The OpenTherm (OT) protocol is a point-to-point communication system, which connects a boiler with a room controller or other devices. The room unit calculates a heating demand (water temperature request) and transmits it to the boiler. The boiler will adjust the heat input accordingly (low-high modulation).

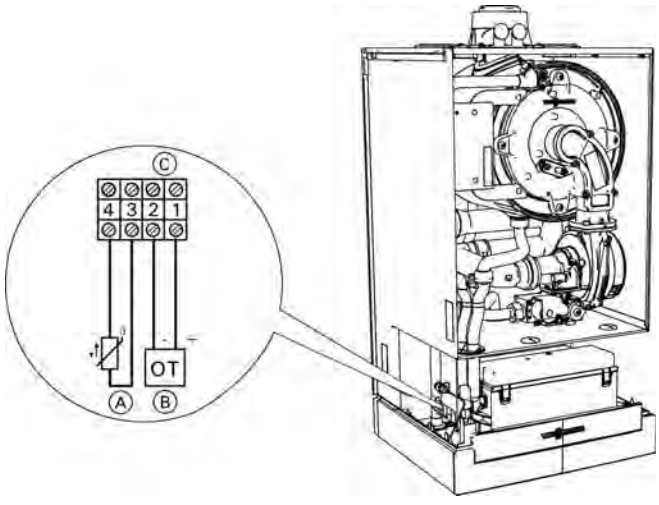
The Viessmann Input Module is designed to accept a 0-10(DC) modulating input signal from a boiler reset module controller and send this signal to the Vitodens 100 with OpenTherm communication.




**Legend**

Ⓐ Viessmann outdoor temperature sensor (field wiring)
Ⓑ OpenTherm (field wiring)
Ⓒ Connection cable terminal
Ⓓ Power pump module

Follow the installation instructions of the field supplied operating controls.




*Terminal strip for accessories connections.*



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# Technical Data

**Call for heat priority logic table**

The Vitodens 100-W, WB1B boiler has several operating control options. The following table provides the priority levels of each of the different operating controllers.

| Priority | Control operating mode | Required signal *1 | Pump output | Pump off delay |
|---|---|---|---|---|
| 1 | Freeze protection | Boiler temperature < 41°F (5°C) | On | 4 minutes (240 seconds) |
| 2 | OpenTherm | OT signal | On | 20 seconds |
| 3 | CombiPLUS | DHW flow sensor / temp. sensor | On | none |
| 4 | DHW / external heat demand | Close DHW contact in power / pump module<br>- boiler set-point temp. = 172°F (78°C) (non-adjustable) | On | 20 seconds |
| 5 | Outdoor temperature sensor*2 | - Temperature dial "🌡" setting<br>- RT contact closed or OT connection terminals 1 & 2 shorted. | On | 4 minutes (240 seconds) |
| 6 | Room thermostat (RT terminal) | Close RT contact in power / pump module. | On | 4 minutes (240 seconds) |

*1 *Boiler control will adjust the boiler water temperature set-point to the highest of all input signals.*
*2 *Priority #6 (outdoor temperature sensor / RT contact) not functional when OT inputs are recognized by the boiler control.*

## Technical Data *(continued)*

Rated voltage:.....120VAC
Rated frequency:.....60 Hz
Rated current:.....6.0 A~

Max. ambient temperature
- at operation:.....32° to 104°F (0° to +40°C)
- when storing and transporting:.....-4° to +149°F (-20° to +65°C)

Setting of adjustable electronic high limit:.....176°F (80°C)

Setting of fixed high limit safety cut-out (fixed setting):.....210°F (99°C)

Main fuse:.....max. 15A

Power consumption
- Burner:.....max. 105 W
- Control unit:.....max. 10 VA

| | | Standard heating boiler | |
|---|---|---|---|
| **Boiler Model** | **Model No.** | **WB1B 26** | **WB1B 35** |
| **Natural gas and LPG** | | | |
| **CSA input** | MBH | 37-91 | 37-118 |
| | kW | 10.8-26.7 | 10.8-34.6 |
| **CSA output/DOE***1 | MBH | 34-83 | 34-108 |
| **heating capacity** | kW | 9.9-24.3 | 9.9-31.6 |
| **Net I=B=R rating***2 | MBH | 72 | 94 |
| **Heat exchanger surface area** | **ft.²** | 10.23 | 10.23 |
| | **m²** | 0.95 | 0.95 |
| **Min. gas supply pressure** | | | |
| Natural gas | "w.c. | 4 | 4 |
| LPG | "w.c. | 10 | 10 |
| **Max. gas supply pressure***3 | | | |
| Natural gas and LPG | "w.c. | 14 | 14 |
| **A.F.U.E.** | % | 94.0 | 94.0 |
| **Weight** | lbs | 78 | 78 |
| | kg | 34.1 | 34.1 |
| **Shipping weight** | lbs | 95 | 95 |
| | kg | 43 | 43 |
| **Boiler water content** | USG | 0.87 | 0.87 |
| | L | 3.3 | 3.3 |
| **Boiler max. flow rate***4 | GPM | 6.2 | 6.2 |
| | L/hr. | 1400 | 1400 |
| **MAWP** | | | |
| (max. allowable working pressure) | psig | 45 | 45 |
| at 210°F (99°C) | bar | 3 | 3 |
| **Boiler water temperature** | | | |
| - Adjustable high limit (AHL) range | | | |
| space heating (steady state) | °F (°C) | 86 to 176 (30 to 80) | |
| DHW production (set-point) | °F (°C) | 176 (80) | |
| - Fixed high limit (FHL) | °F (°C) | 210 (99) | |
| **Boiler connections** | | | |
| Boiler heating supply and return | NPTM (male) " | ¾ | ¾ |
| Pressure relief valve | NPTF (female) " | ¾ | ¾ |
| Drain valve | (male thread) " | ¾ | ¾ |

**1 Output based on 140°F (60°C), 120°F (49°C) system supply / return temperature.*
**2 Net I=B=R rating based on piping and pick-up allowance of 1.15.*
**3 If the gas supply pressure exceeds the maximum gas supply pressure value, a separate gas pressure regulator must be installed upstream of the heating system.*
**4 See "Typical System Flow Rates" on page 36 in this manual.*

## Technical Data *(continued)*

| | | Standard heating boiler | |
|---|---|---|---|
| **Boiler Model** | **Model No.** | **WB1B 26** | **WB1B 35** |
| **Dimensions** | | | |
| Overall depth | inches | 14⅛ | 14⅛ |
| | mm | 360 | 360 |
| Overall width | inches | 15¾ | 15¾ |
| | mm | 400 | 400 |
| Overall height | inches | 28½ | 28½ |
| | mm | 725 | 725 |
| **Gas supply connection** | NPTF (female)" | ¾" | ¾" |
| **Flue gas** **5* | | | |
| **Temperature at boiler return temperature of 86°F (30°C)** | | | |
| - **at rated full load** | °F (°C) | 127 (53) | 131 (55) |
| - **at rated partial load** | °F (°C) | 90 (32) | 90 (32) |
| **Temperature at boiler return temperature of 140°F (60°C)** | °F (°C) | 167 (75) | 172 (78) |
| **Flue gas value** | | | |
| Mass flow rate (of flue gas) | | | |
| - at rated full load | lbs/h | 79.2 | 100.1 |
| | kg/h | 36.0 | 45.5 |
| - at rated partial load | lbs/h | 33.0 | 33.0 |
| | kg/h | 15.0 | 15.0 |
| Available draught | Pa | 100 | 100 |
| | mbar | 1.0 | 1.0 |
| **Flue gas temperature sensor limit** | °F (°C) | 230 (110) | 230 (110) |
| **Average condensate flow rate** **6* | | | |
| with natural gas | | | |
| - $T_S/T_R$ = 122 / 86°F (50 / 30°C) | USG/day | 1.95-2.3 | 2.5-2.8 |
| | L/day | 8-9 | 9.4-10.5 |
| **Condensate connection** **7* | hose nozzle Ø in. | 1" | 1" |
| **Boiler flue gas connection** **8* | Ø in. (mm) | 2⅜ (60) | 2⅜ (60) |
| **Combustion air supply connection** **8* | outer Ø in (mm) | 4 (100) | 4 (100) |
| **Noise level (at 1 meter)** | | | |
| - at full load | (dB) | 47 | 49 |
| - at partial load | (dB) | 40 | 42 |
| **High altitude (factory set)** **9* | ft. (m) | 0-5,000 (0-1,500) | 0-5,000 (0-1,500) |

**5 Measured flue gas temperature with a combustion air temperature of 68°F (20°C).*
**6 Based on typical boiler cycles, including partial load conditions.*
**7 Requires 1"(25 mm) tubing. See Vitodens 100-W Installation Instructions for details.*
**8 For detailed information refer to the Vitodens Venting System Installation Instructions.*
**9 For 5,000 to 10,000 ft. (1,500 to 3,048 m) operation, a coding address change is required. Refer to the Installation and Service Instructions for details.*

▶ *For information regarding other Viessmann System Technology componentry, please reference documentation of respective product.*

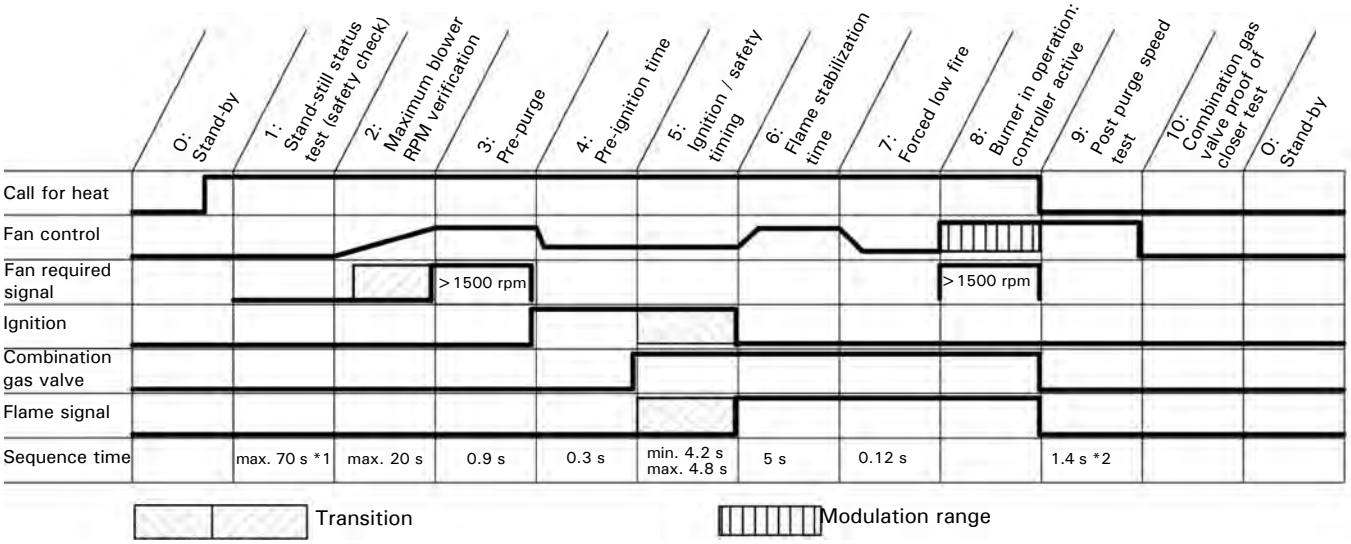
## Technical Data *(continued)*

| | | CombiPLUS Kit | |
|---|---|---|---|
| **Integrated with the Boiler** | **Model No.** | **WB1B 26** | **WB1B 35** |
| DHW supply temperature | °F (°C) | 140 (60) | 140 (60) |
| **Continuous draw rate** *1* | USG/h | 99 | 147 |
| with DCW temp. of 56°F (13°C) | L/h | 374 | 556 |
| **Continuous draw rate** *2* | USG/h | 156 | 216 |
| at $\Delta$ t = 63°F (35K) | L/h | 589 | 800 |
| **Maximum allowable working pressure** (potable water) | psi | 150 | 150 |
| **Test pressure** | psi | 300 | 300 |
| Connections, DHW and DCW | NPTM (male) " | ½ | ½ |
| Connections to boiler supply/return and to heating supply/return | NPTM (male) " | ¾ | ¾ |
| **Dimensions** | | | |
| Overall depth | inches | 9.8 | 9.8 |
| | mm | 250 | 250 |
| Overall width | inches | 17 | 17 |
| | mm | 432 | 432 |
| Overall height | inches | 8.7 | 8.7 |
| | mm | 223 | 223 |
| Height with pipe connector | inches | 13 | 13 |
| | mm | 331 | 331 |
| Integrated pump flow rate DHW production @ 23 ft. (9.8 m) Head pressure | USG/min. | 5.63 | 5.63 |
| | L/h | 1278 | 1278 |
| Heating system operation with system side additional drop in pressure of max. 6 ft. of water (1.8 m) | USG/min. | 6.2 | 6.2 |
| | L/h | 1408 | 1408 |
| **Weight** | lbs | 25 | 25 |
| | kg | 11 | 11 |

*1 Based on boiler max. output and boiler supply temperature of 176°F (80°C).*

*2 DCW and DHW temperature rise would be proportional. Maximum DHW supply temperature is 140°F (60°C).*

# Burner Program Sequence of Operation




**1 50 seconds for no flame present check and 20 seconds for blower stand-stil check (total 70 seconds).*
**2 20 second fan operation if flame failure is detected.*

| Phase | Explanation | End of sequence |
|---|---|---|
| 0 | Stand by | Continue to next phase |
| 1 | Stand-still status test (safety check) | Safety shutdown |
| 2 | Maximum blower RPM verification | Continue to next phase |
| 3 | Pre-purge | Continue to next phase |
| 4 | Pre-ignition time | Retrial for ignition or safety shutdown |
| 5 | Ignition / safety timing | Continue to next phase |
| 6 | Flame stabilization time | Continue to next phase |
| 7 | Forced low-fire | Continue to next phase |
| 8 | Burner in operation: controller active | Continue, or if FHL tripped, 15 minute forced fan operation |
| 9 | Post-purge | Continue to next phase |
| 10 | Combination gas valve proof of closure test | Continue to next phase |
| 0 | Boiler shutdown / stand-by | Waiting for next call for heat |

## Burner Program Sequence of Operation *(continued)*

**Phase 0: Stand by**
Complete shutdown until the next call for heat. In this phase both the combination gas valve and the blower are not energized.

**Phase 1: Stand-still status test (blower)**
A call for heat initiates internal blower sensory communications to confirm that the blower is truly in stand-still position. Blower speed measured must be < 300 rpm within a 70 second period.

**Phase 2: Pre-purge speed test**
Controller sends and receives signal to / from fan speed controller to verify maximum rpm of the blower.

**Phase 3: Pre-purge**
Pre-purge cycle starts within the pre-programmed timing. Pre-purge timing is in addition to previous phase (2). The fan speed must be greater than 1500 rpm.

**Phase 4: Pre-ignition**
The ignition spark is initiated and controlled.

**Phase 5: Ignition / safety timing**
The gas valve opens during the safety timing period (4.8 secs.). If a flame is detected, this phase ends immediately in < 4.8 secs. If the flame is not established after 3 trials, the burner will lock out and will require a manual reset.

**Phase 6: Flame stabilization**
Controller required time for flame stabilization.

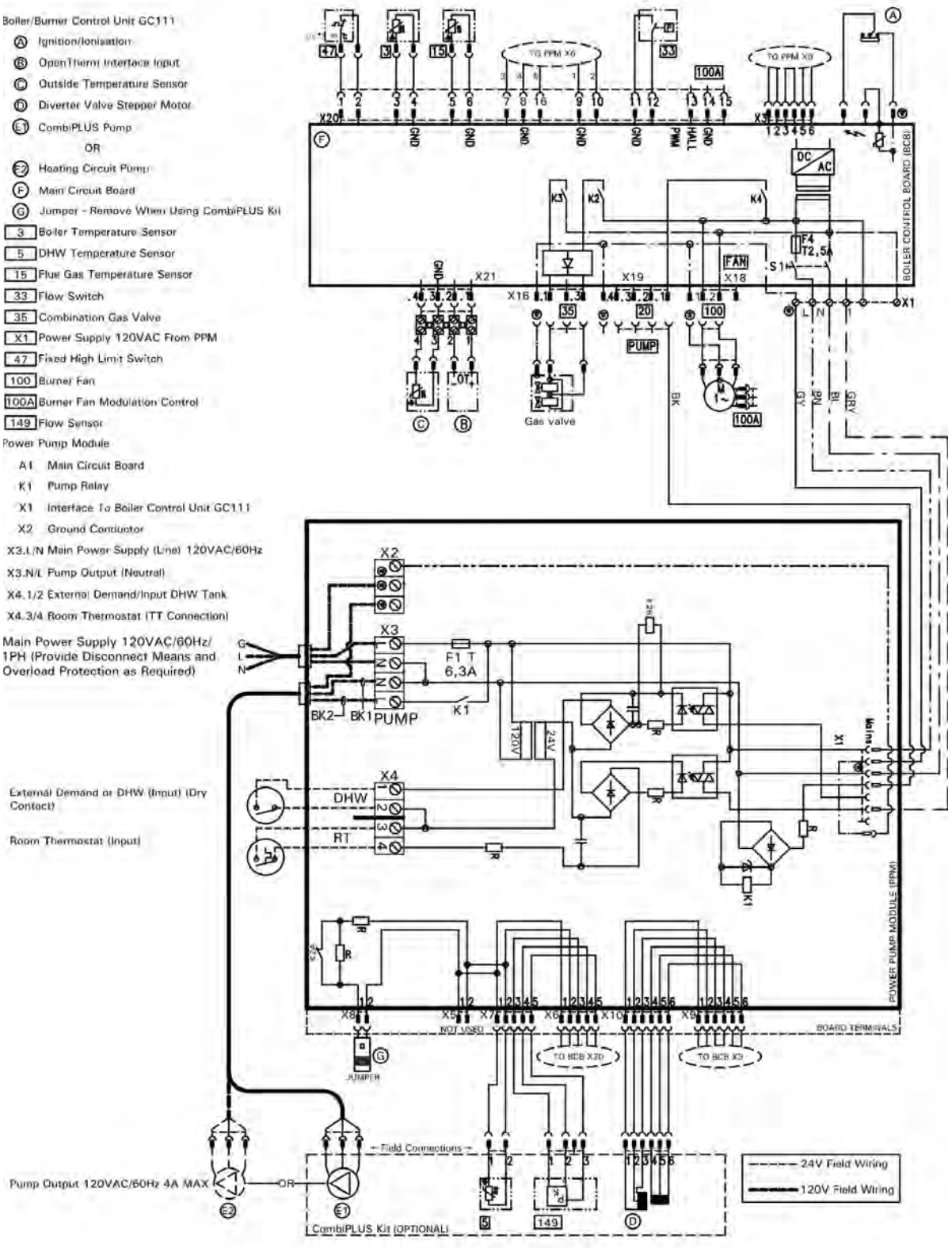
**Phase 7: Forced low-fire**
The controller will go into low-fire until required modulation signal (high-low) is processed (e.g. boiler actual water temperature).

**Phase 8: Burner operation**
At the end of the flame stabilization period (5 sec.), a release for modulation occurs and the burner temperature controller will take over from the flame safeguard. Forced shutdown after 24 hours continuous operation.

**Phase 9: Post-purge speed test**
Both gas valves are closed during this phase. End call for heat.
Post-purge occurs during the programmed period. If the fixed high limit trips during normal operation, the blower will purge for 15 minutes to cool the heat exchanger.

**Phase 10: Combination gas valve proof of closure test**
If during the normal operation of the burner a controlled (or uncontrolled) shut-down occurs, a complete mechanical and electrical gas valve proof of closure test will be performed by the flame safeguard. After a successful mechanical and electrical proof of closure test, the flame safeguard will expect that the flame is not present. If, however, the flame existed for a period of >30 seconds, the flame safeguard will go into permanent lock-out.

# Wiring Diagram - Natural gas / Propane




WARNING! DISCONNECT POWER BEFORE SERVICING BOILER

CAUTION! LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING CONTROLS. WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION. VERIFY PROPER OPERATING AFTER SERVICING.

IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, REPLACE WITH EQUIVALENT.

# Service Function Overview

| Service / Function | Addition / Condition | Activation Sequence | | | | | | Display | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1. | | 2. | | 3. | | | | |
| | | Selector Dial | Position / Selection | Selector Dial | Position / Selection | Selector Dial | Position / Selection | | | |
| Filling | - | | Selector Dial Left | | Control Range | - | - | SERV | + | - |
| | | | | | | | | Static | Static | - |
| Relay Test | - | | Selector Dial Right | | Control Range | | Position 1 And Below → Minimum Load | SERV | | I |
| | | | | | | | | Static | Static | Flashing |
| | | | | | | | Between 1 And 6 → Selected Inputs | SERV | | III |
| | | | | | | | | Static | Static | Flashing |
| | | | | | | | Position 6 And Above → Full Input | SERV | | IIIII |
| | | | | | | | | Static | Static | Flashing |
| Red. Max. Heat Capacity | Activated Relay Test | | Selector Dial Right | | Control Range | - | - | SERV + | III | -.-.- |
| | | | | | | | | Static | Flashing | Flash |
| Eco | - | | Selector Dial Left | | Control Range | - | - | SERV | ECO | - |
| | | | | | | | | momentary | Static | - |
| Comfort | - | | Selector Dial Right | | Control Range | - | - | SERV | COMFORT | - |
| | | | | | | | | momentary | Static | - |
| Boiler with or without Combi Plus | - | + | Mid-Position | | Right Control Range | | Left Control Range Without Combi Plus | SERV | | 0 |
| | | | | | | | | Static | Static | Flashing |
| | | | | | | | Right Control Range With Combi Plus | SERV | | 1 |
| | | | | | | | | Static | Static | Flashing |
| Gas | - | + | Mid-Position | | Left Control Range | | Left Control Range Natural Gas | SERV | | 0 |
| | | | | | | | | Static | Static | Flashing |
| | | | | | | | Right Control Range Propane Gas | SERV | | 1 |
| | | | | | | | | Static | Static | Flashing |
| High Altitude Adjustment | - | + | Mid-Position | | Right Control Range | | Left Control Range 0 - 5000 ft. | SERV | | II |
| | | | | | | | | Static | Static | Flashing |
| | | | | | | | Right Control Range 5000 - 10000 ft. | SERV | | II |
| | | | | | | | | Static | Static | Flashing |



5600 332 -06

# Parts List

| **Model No.** | **Serial No.** |
|---|---|
| WB1B 26 | 7374861□□□□□□□□□ |
| WB1B 35 | 7374862□□□□□□□□□ |
| WB1B 26c | 7457960□□□□□□□□□ |
| WB1B 35c | 7457961□□□□□□□□□ |

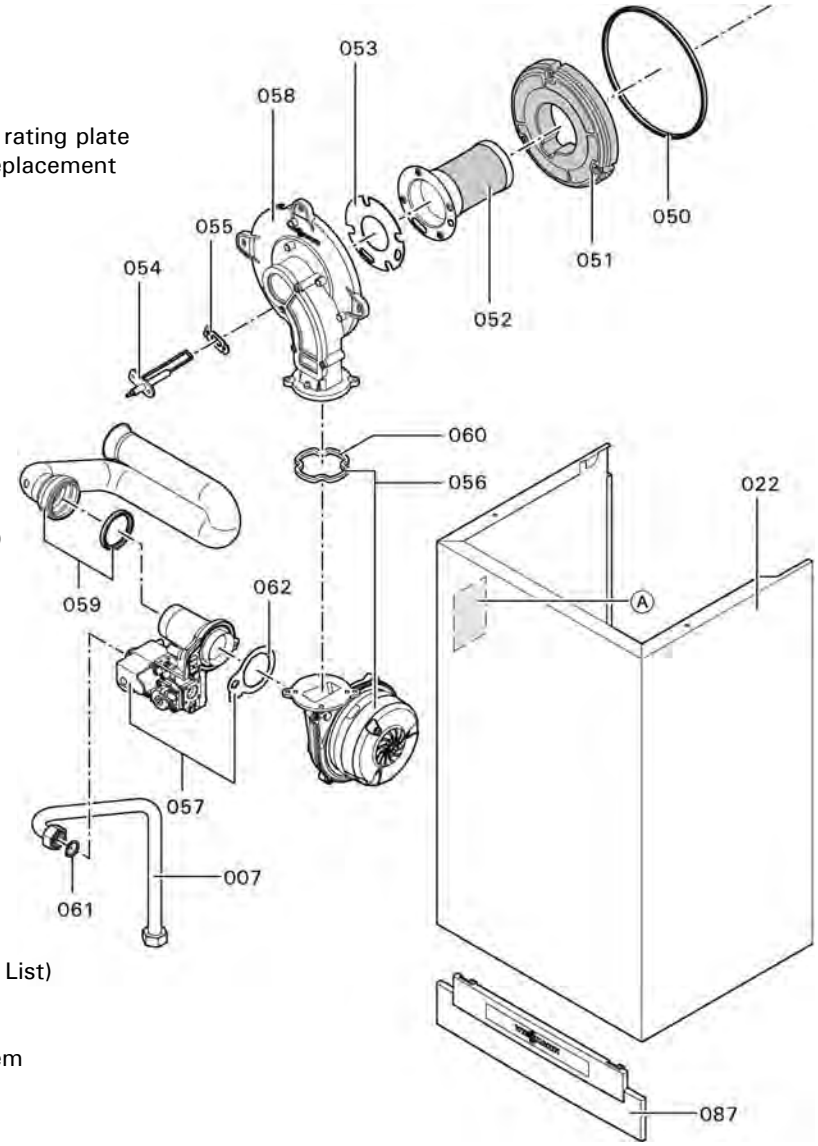
**Ordering Replacement Parts:**
Please provide Model and Serial Number from rating plate Ⓐ when ordering replacement parts. Order replacement components from your Viessmann distributor.

**Parts**

| | |
|---|---|
| 007 | Gas connection pipe |
| 022 | Front panel |
| 050 | Burner gasket, d = 187 x 5.5 mm |
| 051 | Combustion chamber door refractory |
| 052 | Burner tube |
| 053 | Gasket for burner tube |
| 054 | Ignition + ionization electrode block |
| 055 | Gasket for electrode block |
| 056 | Radial fan NRG118-CVI,120/1/60 |
| 057 | Gas valve/Venturi assembly, 120/1/60 |
| 058 | Burner mounting flange assembly |
| 059 | Venturi extension |
| 060 | Gasket for radial fan |
| 061 | Gasket set for gas connection pipe |
| 062 | Gasket set for gas valve / Venturi assembly |
| 087 | Flip-down cover |

**Other Parts** (not illustrated)

| | |
|---|---|
| 090 | Hinges for control housing (set of 10) |
| 107 | Touch-up spray paint “Vitowhite” |
| 108 | Touch-up paint stick “Vitowhite” |
| 109 | Conversion kit, NG > LPG |
| 110 | Conversion kit, LPG > NG |
| 400 | Installation fittings (see separate Parts List) |
| 420 | Installation / Service Instructions |
| 421 | Operating Instructions |
| 422 | Installation Instructions, Venting System |
| 423 | Warranty Sheet Condensing |
| 424 | Parts List |



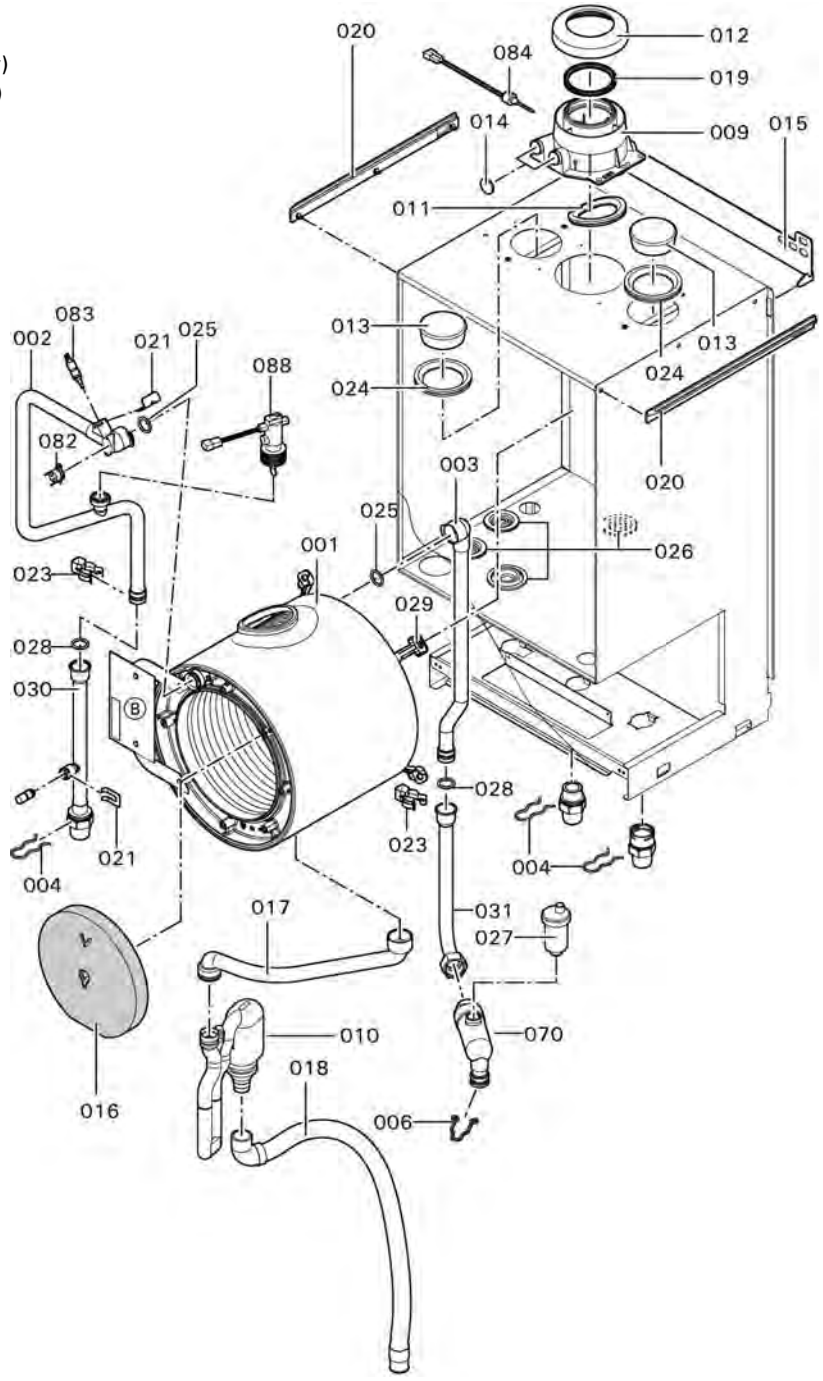

Ⓐ CSA rating plate

## Parts List *(continued)*

**Parts**

001 Heat exchanger assembly, ASME
002 Heat exchanger connection pipe (supply)
003 Heat exchanger connection pipe (return)
004 Spring clips (set)
006 Fastener set (return pipe)
009 Vent pipe adaptor
010 P-Trap
011 Gasket for flue gases
012 Air intake cover
013 Air intake cap
014 Test port cap (set of 2)
015 Wall-mount bracket
016 Combustion chamber refractory
017 Condensate pipe
018 Condensate hose
019 Gasket for air intake
020 Guide rails (set of 2)
021 Clip d = 8 (set of 5)
023 Connector retaining clip (set of 2)
024 Sealing grommet, DN60
025 O-ring set for heat exchanger, 21 x 3 mm
026 Sealing grommet set
027 Air vent with shut-off base, ⅜"
028 Supply/return O-ring set,18 x 3 mm
029 Support bracket set for heat exchanger
030 Heating supply connection pipe
031 Heating return connection pipe
070 Heating return connection elbow including air vent (027)
082 Fixed high limit, 210°F (99°C)
083 Boiler sensor
084 Flue gas sensor
088 Flow switch VK315M

Ⓑ ASME Rating plate



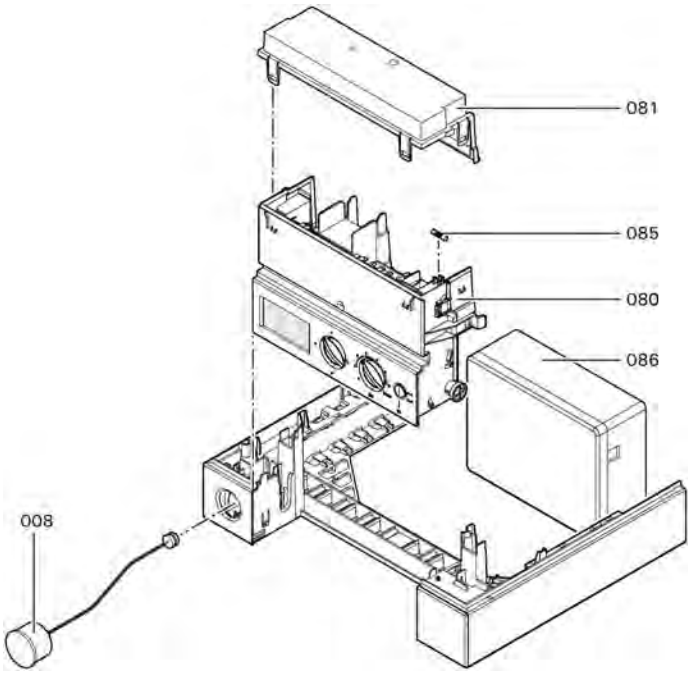



5600 332 -06

## Parts List *(continued)*

**Parts**
008 Pressure gage (PSI)
080 Control console
081 Control console cover
085 Fuse, 2.5A/250V (pkg of 10)
(for control console 080)
086 Power/Pump control module

**Other Parts** (not illustrated)
089 Fuse, 6.3A/250V (pkg of 10)
(for 086 Power/pump control module)
063 Control bracket
101 Wiring harness, X20
102 Connecting cable No. 35 for gas valve
103 Connecting cable No. 100 for radial fan
104 Connecting cable for ignitor
105 Strain relief
106 Grounding wire for ignition electrode
107 Wire harness, X21



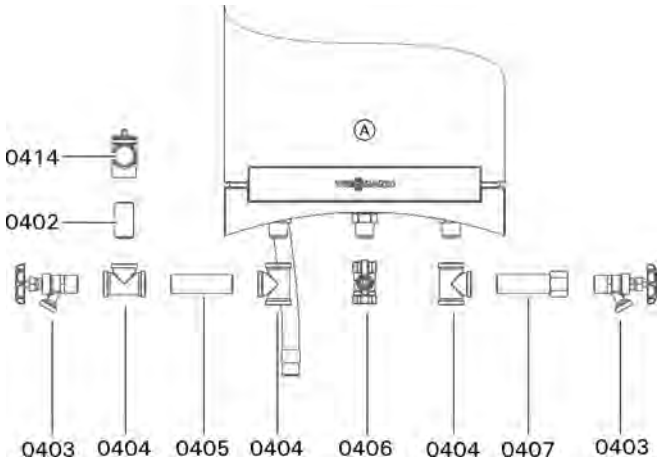

**Installation fittings**

**Parts**
0414 Pressure relief valve
0402 Nipple, ¾" x 2"
0403 Sediment fauset
0404 Tee, ¾"
0405 Nipple, ¾" x 3½"
0406 Gas ball valve, ¾"
0407 Extension, ¾" x 3"

**Other Parts** (not illustrated)
0410 Accessory pack (metal stud mount kit)
0413 Outdoor temperature sensor
0416 Temperature guage 2" 30-250°F ** 1*
0425 Parts list, Installation fittings

** 1* Install anywhere in supply piping near boiler

Ⓐ Vitodens boiler see separate parts list and for CombiPLUS Kit see separate parts list



## Parts List *(continued)*

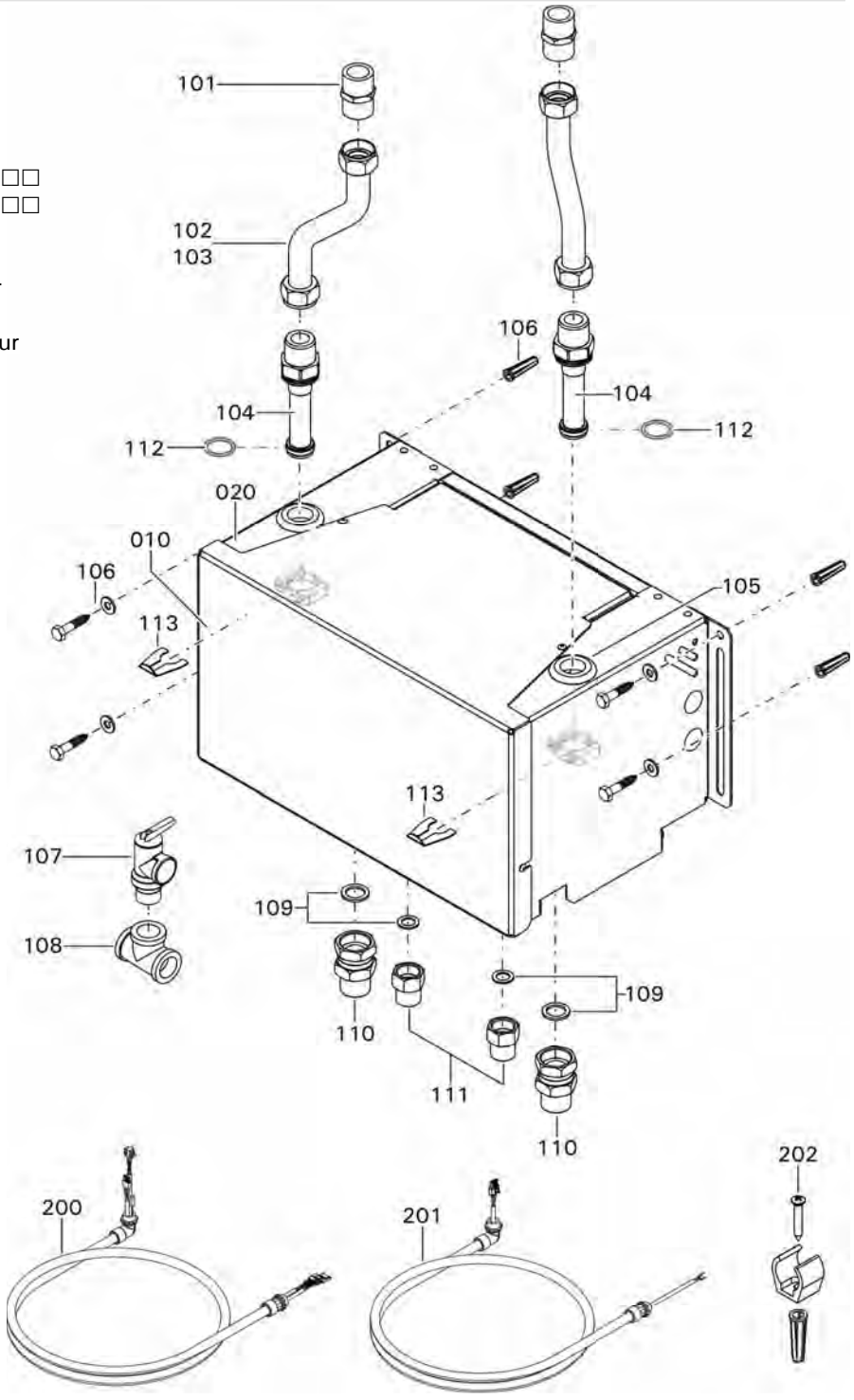
**CombiPLUS Kit**
Part No. 7459 305

| **Model No.** | **Serial No.** |
|---|---|
| WB1B 26c | 7457960□□□□□□□□□ |
| WB1B 35c | 7457961□□□□□□□□□ |

**Ordering Replacement Parts:**
Please provide Model and Serial Number **1* when ordering replacement parts. Order replacement components from your Viessmann distributor.

**Parts**

010 Cover panel
020 Bottom panel
101 Nipple, ¾" HEX
102 Flex pipe, ¾" x 7"
102 Flex pipe, ¾" x 12" - Optional
104 Connectors (set of 2)
105 Sealing grommet
106 Accessory pack, anchors (set of 4)
107 Pressure relief valve, ¾" 150 psig
108 Tee, ¾" brass
109 Gaskets, assortmentof ½", ¾"
110 Adaptor, G ¾" F x NPT ¾" M
111 Adaptor, G ½" F x NPT ½" M
112 0-ring, 17x4
113 Clip, d = 18
200 Harness for sensors
201 Harness for pump
202 Accessory pack, conduit clips (set of 2)




**Other Parts** (not illustrated)

100 Installation fittings (items 101 to 111 and 390, complete set)
400 Installation / Service Instructions
401 Quick Start-up Guide
402 Parts List
403 Installation Template
404 Touch-up spray paint "Vitowhite"
405 Touch-up paint stick "Vitowhite"

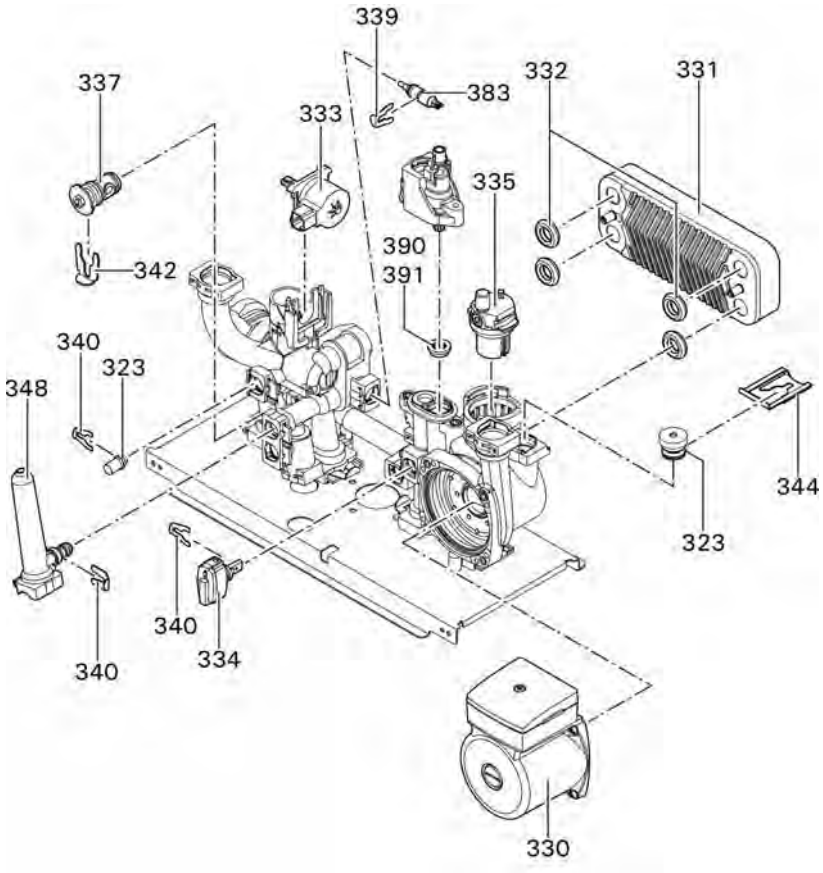
**1 Serial no. is located on bottom of unit.*

See separate parts list for boiler.

## Parts List *(continued)*

**Parts**

| | |
|---|---|
| 323 | Accessory pack, plugs, clips (340 and 344) |
| 330 | Replacement powerhead, UPS15-78, 120/1/60 |
| 331 | Plate heat exchanger, 20 plates |
| 332 | Gasket set, PWT |
| 333 | Step motor, linear |
| 334 | Flow sensor |
| 335 | Air vent |
| 337 | Bypass cartridge |
| 339 | Clip d = 8 (set of 5) |
| 340 | Clip d = 10 (set of 5) |
| 342 | Clip d = 16 (set of 5) |
| 344 | Clip SIV special (set of 5) |
| 348 | Expansion pipe |
| 383 | Sensor #3 boiler |
| 390 | Flow regulator, 10L (for use with WB1B-26 only) |
| 391 | Flow regulator, 14L (for use with WB1B-35 only) |



| **Measurements** | | Service date:<br><br>by: | Service date:<br><br>by: | Service date:<br><br>by: | Service date:<br><br>by: | Service date:<br><br>by: | Service date:<br><br>by: | **Setpoint value** |
|---|---|---|---|---|---|---|---|---|
| **Static pressure** | *"w.c.* | | | | | | | max.<br>14 "w.c. |
| | | | | | | | | |
| **Running pressure (supply pressure)** | | | | | | | | |
| ☐ Natural gas | *"w.c.* | | | | | | | 4-14 "w.c. |
| ☐ Liquid Propane gas | *"w.c.* | | | | | | | 10-14 "w.c. |
| **Carbon dioxide content $CO_2$** | | | | | | | | |
| ■ at lower end of rated input range (low-fire) | *vol.-%* | | | | | | | |
| ■ at upper end of rated input range (high-fire) | *vol.-%* | | | | | | | |
| | | | | | | | | |
| **Oxygen content $O_2$** | | | | | | | | |
| ■ at lower end of rated input range (low-fire) | *vol.-%* | | | | | | | |
| ■ at upper end of rated input range (high-fire) | *vol.-%* | | | | | | | |
| | | | | | | | | |
| **Carbon monoxide content CO** | | | | | | | | |
| ■ at lower end of rated input range | *ppm* | | | | | | | Never exceed<br>50 ppm air-free |
| ■ at upper end of rated input range | *ppm* | | | | | | | Never exceed<br>200 ppm air-free |

## Lighting and Operating Instructions

# FOR YOUR SAFETY READ BEFORE OPERATING

**W A R N I N G: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.**

**A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.**

**B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.**
**WHAT TO DO IF YOU SMELL GAS**
- **Do not try to light any appliance.**
- **Do not touch any electric switch; do not use any phone in your building.**
- **Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.**
- **If you cannot reach your gas supplier, call the fire department.**

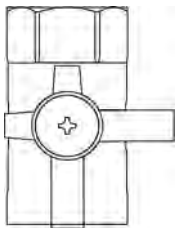
**C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.**

**D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.**

# OPERATING INSTRUCTIONS

1. **STOP! Read the safety information above on this label.**
2. **Set thermostat or other operating control to lowest setting.**
3. **Turn off all electric power to the appliance.**
4. **This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.**

**Manual gas shutoff**



**Closed**

**Open**

5. **Close main gas shut-off valve.**
6. **Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.**
7. **Open main gas shut-off valve.**
8. **Turn on all electric power to the appliance.**
9. **Set thermostat or other operating control to desired setting.**
10. **If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.**

# TO TURN OFF GAS TO APPLIANCE

1. **Set thermostat or other operating control to lowest setting.**
2. **Turn off all electric power to the appliance if service is to be performed.**
3. **Close main gas shut-off valve.**

Printed on environmentally friendly (recycled and recyclable) paper.

Technical information subject to change without notice.

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